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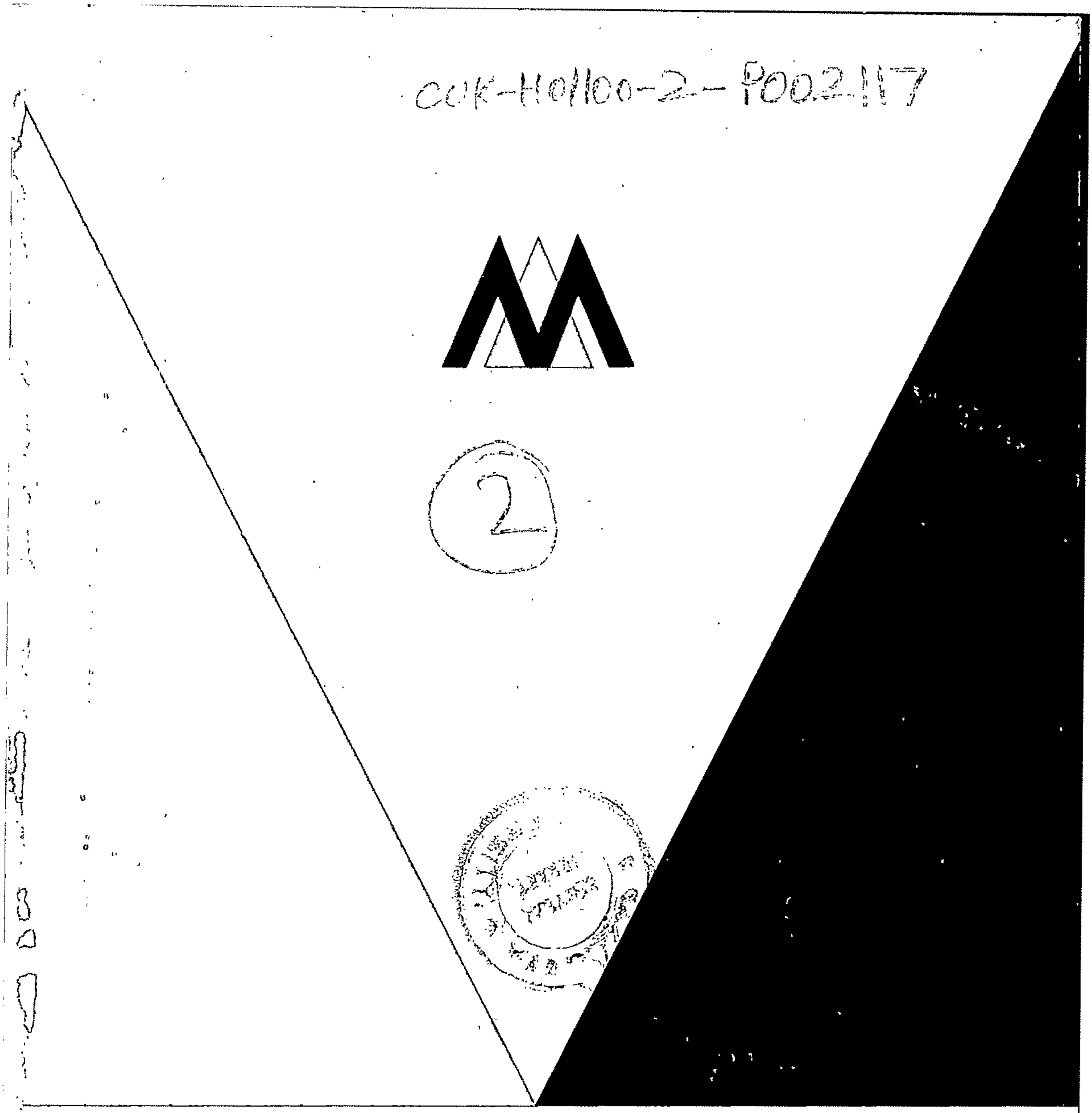

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The Effects of Strategic Planning on Common Stock Returns[1]

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In a study of the effects of strategic planning, statistical tests did not indicate significant differences between the returns earned by shareholders of planning firms and nonplanning firms. There was indication of a transitory reduction in the riskiness of planning firms after the initiation of planning, relative to nonplanning firms, where risk is measured in a capital asset pricing model framework.

The effects of strategic planning on the economic performance and the overall riskiness of large manufacturing firms are measured by an examination of stockholders' returns. Strategic planning is defined here as the systematic process of determining the firm's goals and objectives for at least three years into the future and developing the strategies that will govern the acquisition and use of resources to achieve these objectives. Although there has been a proliferation of literature advocating strategic planning in recent years, considerable disagreement exists in the business community as to its economic impact.

Ringbakk (1969) found that organized corporate long-range planning is neither as well accepted nor as well practiced as suggested by the literature on the subject. Gerstner (1972) concluded that in the majority of companies, corporate planning is an academic, ill-defined activity with little or no bottom-line impact. Stonich (1975) wrote that many executives are disappointed by their formal corporate planning systems.

In contrast, Garretson (1974) attributed much of 3M Company's growth to careful long-range planning. *Industry Week* ("Planning Brings Profits," 1976) reported that record earnings for Bendix Corporation were due partially to the firm's planning activities. *Business Week* ("At Potlatch Nothing Happens without a Plan," 1975) noted that emphasis on sophisticated strategic planning in Potlatch Corporation led to impressive increases in earnings and return on equity.

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[1] This paper is adapted from the author's Ph.D. dissertation (1978). The author is grateful to his dissertation committee—William Beranek (Chairman), William King, Gershon Mandelker, Ali Reza, and John Grant—for their guidance throughout this research. An earlier version of this paper was presented at the Financial Management Association meeting in Seattle, Washington, in October 1977. The comments of two anonymous referees for this journal have been beneficial.

Several studies have been performed to assess the economic impact of strategic planning. Ansoff, Avner, Brandenburg, Portner, and Radosevich (1970) investigated the impact of planning on the success of acquisitions in 93 American firms during the period from 1946 to 1965. Ansoff et al. found that planners significantly outperformed nonplanners on virtually all economic criteria, including sales, earnings, earnings per share, and return on common equity.

Thune and House (1970) studied the effects of long-range planning on the economic performance of 36 firms in 6 industries. Five performance measures were used: sales, stock prices, earnings per share, return on common equity, and return on total capital employed. Thune and House found that formal planners significantly outperformed informal planners in the drug, chemical, and machinery industries, but no clear associations were found in the food, oil, and steel industries.

Herold (1972) extended Thune and House's study by introducing a new performance measure—pretax profits. He found that five formal planners in the drug and chemical industries outperformed five informal planners in these industries.

Rue (1973) studied the relationships between long-range planning and the economic performance of 386 firms in the nondurable, durable, and service industries. He found that in the durable industries, planners outperformed the nonplanners; in the service industries, nonplanners outperformed the planners. But in the nondurable industries, he found no consistent differences.

Karger and Malik (1975) measured the effects of formal integrated long-range planning on economic performance for 38 firms in the chemical, drug, electronic, and machinery industries. They found that planners outperformed nonplanners on 10 of 13 economic measures, including sales, net income, return on net worth, and earnings per share.

Grinyer and Norburn (1975) analyzed the relationships between characteristics of the strategic planning process and financial performance for 21 United Kingdom companies. Data for this study were developed from structured in-depth interviews with 91 executives in these companies. Multiple interviews were used because the perceptions of a single interviewee could be biased and the perceptions of a number of executives were necessary for the level of agreement between them to be established.

Consensus tests and agreement scales were developed to measure the extent of agreement among respondents in companies on various characteristics of the strategic planning process. Correlation and factor analysis were performed using these scales. Financial performance was measured from 1966 to 1970 using various firm financial ratios, including size, profitability, performance, and growth ratios. Return on net assets was the only measure of profitability that was used.

Grinyer and Norburn found no evidence to suggest that common perception of objectives, clarity of role perception, and formality of planning are related to financial performance. Nor did they find a statistically significant relationship between the number of formal communication processes used and financial performance. Based on these findings, Grinyer and Norburn concluded that there is no basis for believing that formal corporate planning is generally associated with high financial performance. However, their analysis did suggest that the number of informal communication channels and the number of items of information used in reaching decisions were positively correlated with financial performance.

The main weakness of all these previous studies is a lack of control of extraneous, independent variables that could have influenced economic performance. For example, these studies ignored general market conditions such as economic conditions and governmental factors that differentially affect all or most firms. Furthermore, some of these studies employed small sample sizes. The present paper attempts to improve on these previous studies by using a different approach, one that more effectively isolates the effects of planning and controls for other independent variables. Economic performance is measured by focusing on stockholders' returns rather than firm performance measures because much of business finance is directed at maximizing stockholder wealth. In addition, this approach adjusts for risk in measuring shareholders' returns. One implication of capital market theory is that there is a positive linear relationship between risk and return (Jensen, 1972). Adjusting for risk is important because shareholders of planning firms may have earned higher returns because the firms were in higher risk classes and not because they were engaged in planning. (This risk-return relationship, which will be quantified later, relates to the investor's opportunity set and not to the investor's risk-preference function.)

THE SURVEY

To perform this study, it was necessary to: (1) identify the firms that were engaged in strategic planning, (2) determine when these firms initiated strategic planning, and (3) classify each of the firms according to the degree of completeness of its planning process, based on objective criteria. The only feasible method for collecting this information was a mail survey because: (1) the data were not readily available from other sources, (2) a large heterogeneous sample representing different industries was desired, and (3) interviews were prohibitively costly because firms are geographically dispersed.

A questionnaire was sent to *Fortune's* 500 largest companies and 57 other firms that were believed to be engaged in strategic planning. The 348 replies received represented a response rate of approximately 62 percent. Of the replies, 328 were usable, resulting in a usable response rate of 59 percent. Based on the questionnaire responses, three planning classes were formed:

Class 1: (Nonplanners) no formal long-range planning process
Class 2: (Incomplete planners) written long-range plan covering at least three years ahead but not meeting all the requirements of class 3 planners
Class 3: (Complete planners) most comprehensive, systematic, future-oriented long-range planning process

(The objective criteria used to form each planning class are available from the author upon request.)

The Class 3 planners prepare a written long-range plan for at least three years into the future, quantify objectives and goals, prepare pro forma financial statements over the planning horizon, have mechanisms for scanning the external environment, plan for virtually all facets of their operations in a systematic way, and have procedures for monitoring performance against the plan.

Based on this classification procedure, the 328 firms were divided into 51 Class 1 planners, 116 Class 2 planners and 161 Class 3 planners. (A list of the sample firms is available from the author upon request.) The final sample used in the analysis of economic performance consisted of 78 planners and 51 nonplanners. The 78 planners were selected from Class 3. These sample firms are widely held and actively traded New York Stock Exchange firms.

It is important that industry effects be controlled so that the effects of planning on performance can be measured. (King [1966] showed that the industry factor explains about 10 percent of the variation of stock returns on average.) Thus, these effects account for a relatively small part of the rate-of-return variance and are not a serious problem if the industry-by-industry distributions of firms in the planning and nonplanning groups are more or less proportionate to each other. As shown in Table 1, the industry profiles of the 78 planning firms and 51 nonplanning firms indicate that this is the case. Thus industry effects can be ignored.

TABLE 1
Industry Profiles of Sample Firms

S.I.C. Code[a]	*Major Industry*	*Number of* *Planning Firms*	*Nonplanning Firms*
10-14	Mining	5	5
20-27	Food and kindred products	15	10
28-34	Chemicals and allied products	20	11
35	Machinery, except electrical	12	7
36	Electrical machinery[b]	6	4
37	Transportation equipment	9	4
38-39	All other manufacturing	3	1
40-49	Transportation[c]	2	2
50-59	Wholesale and retail trade	3	2
60-67	Finance[d]	3	5
		78	51

[a] First two digits of Standard Industrial Classification Code.
[b] Includes electronic machinery, equipment, and supplies.
[c] Includes communication and other public utilities.
[d] Includes insurance and real estate.

The remaining 199 Class 2 and Class 3 firms were excluded because: (1) the questionnaire responses did not indicate the year that planning was initiated, (2) monthly stock return data were not available, (3) firms were not engaged in planning for a sufficient length of time to measure the effects of planning, or (4) the planning process was incomplete.

THE MODEL

Sharpe (1964), Lintner (1965), Mossin (1966), and Fama (1968, 1971) derived the capital asset pricing model. This model, shown in equation (1), develops the relationship between risk and expected return.

$$E(\tilde{R}_j) = R_F + (E(\tilde{R}_M) - R_F)B_j \qquad (1)$$

where

E is the expected value operator

$\tilde{}$ indicates a random variable

$\tilde{R}_j$ is the return on security j

R_F is the riskless rate of interest

$\tilde{R}_M$ is the return on the market portfolio which consists of an investment in every asset outstanding in proportion to its total value

B_j is Cov $(\tilde{R}_j, \tilde{R}_M)/\sigma^2(\tilde{R}_M)$ which represents the risk of asset j relative to the total risk of the market portfolio M, and is proportional to the contribution of asset j to the total risk of the market portfolio.

The model implies that the expected return on an asset is equal to a riskless rate of interest plus a risk premium where the risk is measured by the covariance of the asset's return with returns on all assets. The model implies a linear relationship between the expected return on a stock and its risk in the market portfolio.

The capital asset pricing model as defined by equation (1) is not directly testable because it is an ex-ante model; that is, expected returns are not observable. One ex-post analog of the capital asset pricing model that does fairly well as a model of a stochastic process generating security returns is the one-factor market model.[2] The firm performance measure used in this study is empirically derived from the one-factor market model.

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[2] Capital asset pricing theory and the capital asset pricing model have been widely questioned in recent years based on the empirical evidence. Roll (1977) stated that no valid test of the model has been performed because of the inability to correctly measure the true return on the market portfolio. Friend, Westerfield, and Granito (1978) presented recent evidence which suggests that residual risk, in addition to beta, may be systematically related to expected returns, a finding that is contrary to the implications of the capital asset pricing model. Friend et al. (1978) also report test results that suggest that stocks and bonds are priced differently and that the risk-free rates of interest developed from empirical tests are inconsistent with actual risk-free rates of interest.

Sharpe (1978), on the other hand, in discussing the Friend et al. paper, pointed out some limitations in the tests and argued that there will always be a problem in using ex-post data to test theories dealing with ex-ante predictions. Sharpe cited an analysis made by Wells Fargo Bank that yielded results that are consistent with the predictions of the capital asset pricing model. In summary, it is safe to say that the capital asset pricing model does not provide a complete description of the structure of security returns. However, the usefulness of the model does not depend on it being an exact description of the real world but rather on how well it describes the observed relationship between risk and return. The model has done well enough on this score to be used by a number of researchers including Ball and Brown (1968), Fama, Fisher, Jensen, and Roll (1969), Scholes (1972), Sundar (1973), Klemkosky and Martin (1975), Bar-Yosef and Brown (1977), Kon and Jen (1978), and Hopewell and Schwartz (1978).

The one-factor market model was suggested by Markowitz (1959) and was simplified by Sharpe (1963), who called his model the diagonal model. Fama (1968) conferred the name market model to distinguish it from the capital asset pricing model. One form of the market model is shown in equation (2).

$$R_{jt} = a_{jt} + b_{jt}R_{mt} + u_{jt} \tag{2}$$

where

R_{jt} is the observed monthly return for security j in period t (dividends plus capital gains divided by initial price)

R_{mt} is the observed average monthly return on a value-weighted market portfolio of all assets on the New York Stock Exchange

a_{jt}, b_{jt} are parameters to be estimated by least squares

u_{jt} is the calculated residual for security j in period t

An alternative formulation involves defining excess returns in the following way:

$$R_{jt} - R_{ft} = b(R_{mt} - R_{ft}) + u_{jt}$$

where R_{ft} is the risk-free rate in period t. No attempt was made to use this model because equation (2) was deemed to be adequate. Theoretically, the two models are equivalent because a_{jt} from equation (2) should equal $R_{ft}(1-b)$.

The capital asset pricing model and market model are consistent if the returns on individual securities are linearly related to the market returns as described in equation (2), the usual regression assumptions are satisfied, and equation (1) is a correct description of expected returns. In this case B_j from equation (1) equals b_j from equation (2).

Because securities have different levels of risk as measured by b_{jt} in equation (2) where b_{jt} is an estimate of beta, market-wide factors can be expected to have a differential impact on stock prices and returns. Consequently, it would be inappropriate to examine directly the behavior of stock price movements or realized returns. To control for these differential effects, the residual approach is used.

The residual approach was first used by Fama et al. (1969). This approach involves determining the residuals from the market model, which thereby abstracts from the effects of general market factors. (A variant of this approach was used by Alexander and Buchholz [1978] to examine the relationship between corporate social responsibility and stock market performance.) Thus, the behavior of these residuals, rather than realized returns, is examined over the period of interest.

The residuals are calculated from equation (2) as follows:

$$u_{jt} = R_{jt} - \hat{a}_{jt} - \hat{b}_{jt}R_{mt} \tag{3}$$

The systematic part of a security's return is assumed to be captured by its normal relationship to the returns on the market portfolio as reflected by ($b_{jt}R_{mt}$). Any returns not accounted for by a security's normal relationship to the market will be impounded in the residual, u_{jt}. The residual captures the effects of company-specific effects such as the initiation of strategic planning.

The residual, u_{jt}, which is the security-specific component of R_{jt}, can be viewed as the return on security j in excess of that expected from acquiring a diversified portfolio of equivalent risk. In this sense, returns are adjusted for risk, and u_{jt} may be considered an abnormal return because the effects of a_{jt}, b_{jt}, and R_{mt} are netted out.

Each security's residuals are used to compute an average residual for each month relative to the month strategic planning was adopted, by cross-sectionally averaging over all securities in the sample. The month strategic planning was adopted is defined as month zero and, in general, will be chronologically different for each security. The average residual is calculated as shown in equation (4).

$$U_t = \frac{1}{N_t} \sum_{j=1}^{N_t} u_{jt} \tag{4}$$

where

N_t is the number of securities in the sample in month t.

The average residual, U_t, is the average deviation of the returns of the securities in the sample from their normal relationships with the market. If it is assumed that the market reacts immediately and unbiasedly to new information, that is, the market is efficient, U_t can be viewed as an unbiased estimate of the market reaction to the information that came to the market in the tth month relative to the month strategic planning was adopted. The expected value of U_t is zero, and any significant deviations can be interpreted to be associated with the company-specific event, initiation of strategic planning.

In summary, the main advantages of the market model are: (1) it permits a separation of market-wide variables that differentially affect all securities from variables that are unique to a particular firm and (2) it adjusts for risk in measuring shareholders' returns. Although it is a hopeless task to try to control for all other independent variables, the present approach more effectively isolates the effects of strategic planning than does any other previous study.

The source of monthly stock return data and value-weighted market returns is the University of Chicago's Center for Research in Securities (CRSP) Monthly Price Relative File. Because monthly return data are used and only the year in which firms adopted strategic planning is known from the survey, July was selected as month zero (the month strategic planning was initiated).

For a standard of comparison, a hypothetical month zero was selected for the nonplanners. Most of these hypothetical month zeros were the same as the actual month zeros for the planners so that the same time periods were studied. These months were randomly assigned to the nonplanners using a table of random numbers.

Because information on performance prior to planning was needed, a preplanning period of five years was used. A post-planning period of 10 years was used to take into account the strategic-decision time lag. This time lag refers to the time between the making of strategic decisions and the time the benefits were realized. For example, major investments in advanced technology industries may not come to fruition for 8 to 10 years.

The market model assumes that the estimate of beta, b_{jt}, is constant over the relevant time period. To account for a changing beta, a beta was calculated for every month using five years of prior return data. (This technique was used by Mandelker [1974].) For example, to estimate beta in month t, $(t-60)$ through $(t-1)$ months of return data were used. Using a preplanning period of 5 years as described above and post-planning period of 10 years, a total of 181 betas were calculated for each firm including month zero, subject to the availability of return data. Betas were estimated by regressing security returns on market returns, using the one-factor market model.

HYPOTHESES

Two statistical hypotheses were formulated.

Statistical Hypothesis 1: Shareholders of strategic planning firms earned abnormal returns, while shareholders of nonstrategic planning firms did not earn abnormal returns, where the measure of abnormal returns is the average residual.

This hypothesis rests on the assumption that firms engaged in strategic planning make improved current decisions by considering the futurity of these decisions, which in turn is reflected in stock prices. These firms are hypothesized to influence the future in a desired direction and to anticipate, avoid, and change events that could have a negative impact on their businesses.

There are two ways in which the results of this study would support Hypothesis 1. First, the average residuals for the planners are significantly greater than zero around the month planning was initiated, but the average residuals for the nonplanners are not significantly different from zero. This result would be consistent with the efficient market hypothesis, which states that stock prices fully reflect all available information. (For an excellent summary of the theory of efficient capital markets and the relevant empirical research, see Fama [1970].) It is hypothesized here that investors revise their return expectations when they receive information on a firm's planning activities. In other words, they discount this favorable information and make unbiased estimates of future returns. Subsequent to the month planning was initiated, residuals resume their normal relationship with the market by being randomly distributed around zero.

Second, if there is a delay in transmission of information about a firm's planning activities because of market inefficiencies, the firm does better than expected and investors earn abnormal returns after planning is initiated until the market finds out and price adjustments occur. In other words, the market is surprised by the improved performance of the planners and, accordingly, the market revises its return expectations for these firms. In this case the average residuals increase over time after the introduction of planning because the benefits of planning are realized at different times in different firms, and then the residuals decrease over time.

Statistical Hypothesis 2: The average betas for the planning firms are significantly different after planning is initiated as compared to the average betas prior to planning.

This hypothesis is based on the belief that strategic planning changes the risk-complexion of the firm. One reason that managers initiate strategic planning is to cope with increasing economic, governmental, technological, and competitive risks. It is hypothesized that by systematically examining the future implications of current decisions, planning firms are more likely to identify opportunities, quantify risk factors, and avoid threats that could significantly alter forecasted operating results. In this sense, the riskiness of these firms is different from what it was prior to planning. One measure of the firm's riskiness is b_{jt} from equation (2). In the context of equation (2), b_{jt} is a measure of the sensitivity of a security's rate of return relative to market fluctuations.

EMPIRICAL RESULTS

Summary results for the planners and nonplanners for every sixth month from −60 to +120 months are shown in Table 2. From Table 2 there does not appear to be any unusual behavior around month zero for the average residuals of planners and nonplanners. The signs of the average residuals appear to be randomly distributed, while plots of the average residuals, shown in Figures 1 and 2, indicate random noise. A chi-square test was performed to test whether in each month the proportions of positive residuals were the same for the planners and nonplanners. Table 2 shows that none of the 31 chi-square statistics is significant at the .05 level. For all the months, only 7 of the 181 chi-square statistics were significant at the .05 level. Based on these results, planning seemed to have a negligible impact on shareholders' returns. The average residuals could just as well have been generated from any random sample.

There are at least two possible explanations for these results.

1. Either investors did not receive information about a firm's planning activities or they received this information but did not view it as important enough to warrant major portfolio revisions. The announcement of a strategic planning program may not be a well-defined informational event to the capital markets.

TABLE 2
Summary Results for Planners and Nonplanners from –60 to + 120 Months

Planners						Nonplanners				
Month	Average Residual	Average Beta	Fraction Positive[a]	No. of Firms	Chi-square Statistic[b]	Month	Average Residual	Average Beta	Fraction Positive[a]	No. of Firms
– 60	–.0006	1.0231	.44	63	.01	– 60	–.0029	.9643	.46	35
– 54	.0191	1.0198	.58	65	.22	– 54	.0213	.9909	.51	35
– 48	.0014	1.0366	.47	66	.12	– 48	–.0035	.9707	.53	36
– 42	–.0029	1.0530	.48	66	.01	– 42	.0218	1.0248	.51	37
– 36	–.0021	1.0917	.40	68	.02	– 36	–.0031	1.0575	.41	37
– 30	–.0016	1.0924	.50	70	.53	– 30	.0030	1.0777	.59	37
– 24	–.0100	1.1261	.37	71	1.99	– 24	.0002	1.1100	.53	38
– 18	.0060	1.1482	.48	71	.84	– 18	.0023	1.1258	.59	39
– 12	–.0056	1.1647	.47	72	.35	– 12	.0137	1.1395	.55	40
– 6	.0016	1.1439	.44	72	.02	– 6	.0035	1.1334	.45	40
0	–.0056	1.1581	.43	72	1.30	0	.0144	1.1404	.56	41
+ 6	.0096	1.1441	.54	72	.06	+ 6	–.0025	1.1249	.50	42
+ 12	–.0066	1.1486	.48	73	.69	+ 12	.0117	1.1915	.57	47
+ 18	.0165	1.1472	.56	73	1.61	+ 18	–.0053	1.2056	.43	47
+ 24	–.0115	1.1308	.41	73	.00	+ 24	–.0057	1.2170	.43	47
+ 30	.0038	1.1707	.58	74	.00	+ 30	.0244	1.2285	.56	48
+ 36	.0055	1.1798	.57	74	.30	+ 36	–.0032	1.2269	.50	48
+ 42	.0163	1.1827	.50	74	2.22	+ 42	.0409	1.2482	.65	49
+ 48	.0191	1.1636	.65	75	2.32	+ 48	.0206	1.2424	.50	50
+ 54	.0176	1.1780	.55	78	.00	+ 54	.0334	1.2166	.57	51
+ 60	.0244	1.1721	.62	71	.00	+ 60	.0282	1.2269	.60	48
+ 66	.0143	1.1471	.54	63	.25	+ 66	.0245	1.2590	.61	41
+ 72	.0072	1.1335	.51	63	.03	+ 72	–.0028	1.2702	.51	41
+ 78	–.0031	1.1248	.47	57	.00	+ 78	.0209	1.2395	.50	40
+ 84	–.0005	1.1288	.46	57	.51	+ 84	.0122	1.2354	.55	38
+ 90	.0082	1.0987	.53	45	.00	+ 90	.0337	1.1934	.50	34
+ 96	.0107	1.1103	.53	45	.46	+ 96	.0184	1.2178	.64	33
+ 102	.0370	1.1288	.61	38	2.07	+ 102	.0241	1.1677	.40	30
+ 108	.0133	1.1399	.58	38	.02	+ 108	.0117	1.1471	.53	30
+ 114	–.0046	1.1037	.34	35	1.00	+ 114	.0035	1.1227	.50	28
+ 120	–.0155	1.0922	.34	35	.07	+ 120	–.00129	1.0896	.41	27

[a] Fraction of positive residuals.

[b] Computed chi-square statistic for a two-by-two classification of residual by its sign and planning class. Yates Correction Factor was used.

2. Because monthly return data were used and only the year in which planning was initiated was known, the assumption that planning was initiated in July for all the firms may have prevented the effects of planning from being observed.

FIGURE 1
Residuals Plot for 78 Class 3 Planners

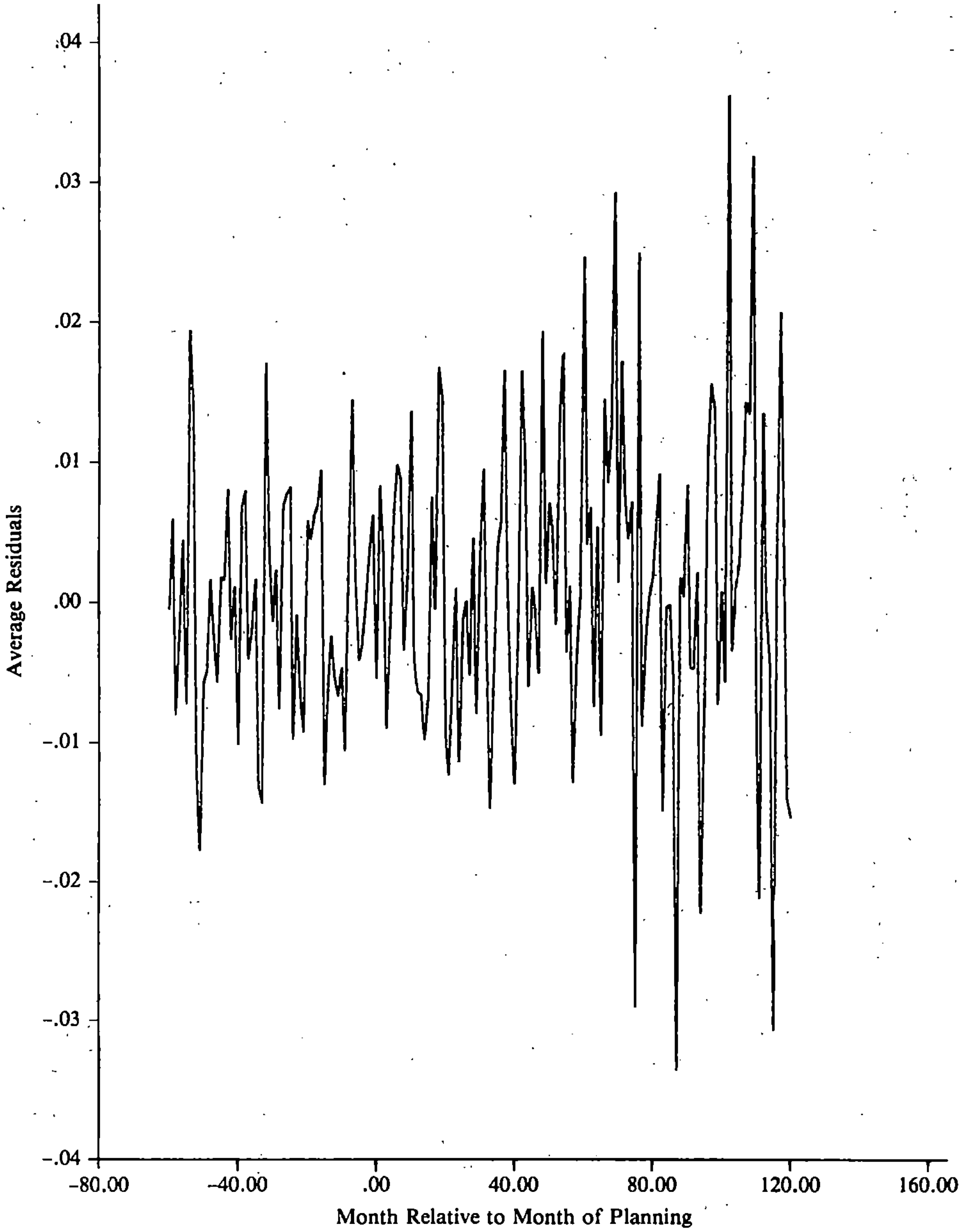
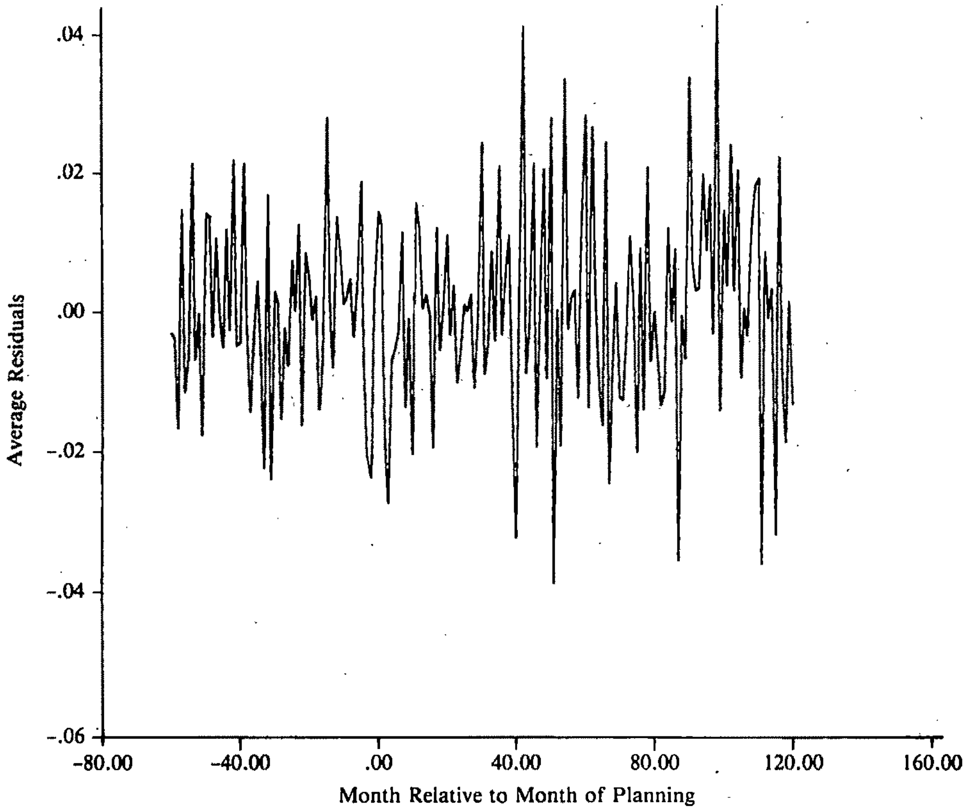


FIGURE 2
Residuals Plot for 51 Class 1 Planners



An inspection of Figures 1 and 2 indicates that the average residuals subsequent to month zero appear to be randomly distributed about zero for the planners and nonplanners. Based on these results, the null hypothesis of Hypothesis 1, that no abnormal returns were earned by shareholders of planning firms after planning was initiated, cannot be rejected.

These results critically depend on how firms were classified as planners. Other classification procedures might have led to different results. However, the classification procedure used is consistent with the literature on planning and is based on a thorough review of previous classification schemes. There are at least five possible explanations for these results.

1. Strategic planning did not lead to significantly improved strategic decisions as reflected in shareholders' returns because the size of the investment in planning by planning firms was not large enough to have a measurable effect.

2. The environments of the planners were so unstable and complex that even the best available planning had a negligible impact on shareholders'

returns. Lindsay and Rue (1976) found that planners do perceive their environments as being more complex and unstable than do nonplanners.

3. The questionnaire may not have had sufficient discriminating power to classify correctly all firms as planners or nonplanners.

4. The market model may not be an accurate description of the process generating security returns.

5. Other factors such as size, history, organizational structure, management style, technology, and market environment may influence performance more than does the planning process. This explanation was given by Grinyer and Norburn (1975) for similar findings obtained using a different methodology.

A "paired" t-test was used to test Hypothesis 2, that the average betas for planners would be significantly different after planning than before planning.[3] For each firm in the sample, a preplanning beta was calculated for relative month -36 and two postplanning betas were calculated corresponding to relative months +67 and +120. Relative month -36 was paired with relative months +67 and +120 because the t-test requires independent samples, and betas were estimated with 60 months of prior return data. This pairing resulted in nonoverlapping periods of return data. Whether the preplanning beta was significantly different from the postplanning beta was tested. Because the same securities are in the sample before and after planning, this is a paired sample for which beta is measured over two different time periods.

The following hypothesis was tested:

$$H_0: \beta_2 = \beta_1 = 0$$

$$H: \beta_2 - \beta_1 \neq 0$$

where the subscript 2 refers to the postplanning beta and subscript 1 refers to the preplanning beta. The null hypothesis implies that strategic planning had no measurable effect on the riskiness of firms as measured by beta. The alternative hypothesis implies that beta changes significantly.

The null hypothesis was tested by computing the difference, d_j, between each security's beta: $d_j = \beta_{2j} - \beta_{1j}$. The t-statistic used to test whether or not to reject the null hypothesis is given by:

$$t = \frac{\bar{d} - 0}{\frac{S_d}{\sqrt{n}}}$$

where $\bar{d} = (\Sigma^n d_j)/n$ and $S_d = (\Sigma^n (d_j - \bar{d})^2/n - 1)^{1/2}$. The calculated t has $N - 1$ degrees of freedom.

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[3] The author is grateful to Gershon Mandelker and an anonymous referee for suggesting this test. See Peters and Summers (1968) for a discussion of the test.

Table 3 summarizes the test results. Notice that betas for 35 Class 1 planners significantly increased using relative month +67 but no significant differences were found for the planning group. However, these differences were only transitory because in relative month +120 no significant differences were found.

TABLE 3
Results of Paired-Sample Analysis[a]

	T^b	M_d	S_d	N^c	t^d
Planners:					
	+67	-.05	.43	56	-.88
	+120	-.03	.36	33	-.43
Nonplanners:					
	+67	.173	.49	35	2.09*
	+120	.044	.43	26	.52

[a] M_d = mean of paired differences; S_d = standard deviation of paired differences; N = sample size; t = t-statistic.

[b] Month relative to month of planning. Post-planning months +67 and +120 are matched with preplanning month -36 in calculating matched pairs of betas.

[c] For each t-test, the same firms are included in the sample before and after planning to maintain the same composition.

[d] See Peters and Summers (1968) for calculation of the t-statistic.

*Significant at the .05 level.

One interpretation of this result is that the strategic planning process led to a transitory decline in systematic risk as measured by beta for the planning firms relative to the nonplanning firms. The transitory nature of this risk reduction may be due to a tendency for planning firms to contract their planning activities when business prospects are good. Also, other factors may have had a greater influence on beta than did strategic planning. These factors include specific growth strategies, degree of leverage, and dividend policy. Accordingly, it may be concluded that strategic planning had no permanent or lasting effect on the riskiness of firms as measured by beta.

SUMMARY AND CONCLUSIONS

This study sought to assess rigorously the economic impact of strategic planning. Because previous studies have not adequately controlled for extraneous, independent variables in the measurement of economic performance, their finding that planners significantly outperformed nonplanners cannot be attributed to planning. In a more refined approach, statistical tests did not indicate significant differences in the returns earned by shareholders of planning firms and nonplanning firms. Planning proponents have asserted that planning and performance are correlated, but this research could not identify a relationship. This finding is consistent with the extensive research of Grinyer and Norburn (1975) who, using a totally different methodology, found no relationship between formal planning and performance.

Statistical tests did suggest that the strategic planning process led to a transitory decline in systematic risk as measured by beta for the planning firms relative to the nonplanning firms. This risk reduction was only transitory, however, because in subsequent time periods no significant differences were found. One explanation for this result is that other factors may have had a greater influence on beta than did strategic planning—factors such as specific growth strategies, degree of leverage, and dividend policy.

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Productivity and Efficiency in Human Service Organizations as Related to Structure, Size, and Age

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A study of the relationship of productivity and efficiency to the organization's structure, size, and age (or "time") indicated that a highly centralized authority structure is the most powerful direct determinant of productivity and efficiency. Conclusions focus on the pervasive conflict between quality and quantity of services delivered and the implications of this for the human service administrator.

Given widespread interest in and pressures for "accountability" in the public arena (Glisson, 1975), surprisingly little attention has been given to the development and testing of models that explain variation in the performance of human service organizations. In organizations that lack straightforward output indicators (such as sales volume or annual profits), it is difficult to identify criteria that are either useful or applicable in the assessment of performance (Hannan & Freeman, 1977). This, perhaps, has stymied the investigation of predictors of success or effectiveness. Nevertheless, the demands of decision makers for relevant and comparable data across organizations underscore the need for establishing performance criteria and, more importantly, for understanding the determinants of successful performance (Whetten, 1978).

The present study presents organizational structure, size, and age as determinants of an organization's performance and empirically investigates their effects on the output criteria of productivity and efficiency in a variety of types of human service organizations. Structure is conceptualized in the hypothesized model as directly affecting productivity and efficiency. Size and age are shown as indirectly affecting the performance

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criteria through their effect on structure. Productivity is defined as the quantity of service provided and efficiency as the per unit cost of providing service. Although these criteria are, in fact, responsive to certain accountability demands, no claim is made that any one is an indicator of the effectiveness of services provided. However, there is general consensus on the meaning or intent of productivity and efficiency, whereas the concept of effectiveness currently is beset by definitional ambiguity in both the human service (Hasenfeld & English, 1974) and organizational literature (Goodman & Pennings, 1977). The prescriptive implications of the model suggest that administrative influence can be wielded over performance through the manipulation of structural dimensions within the constraints imposed by the size and age of the organization.

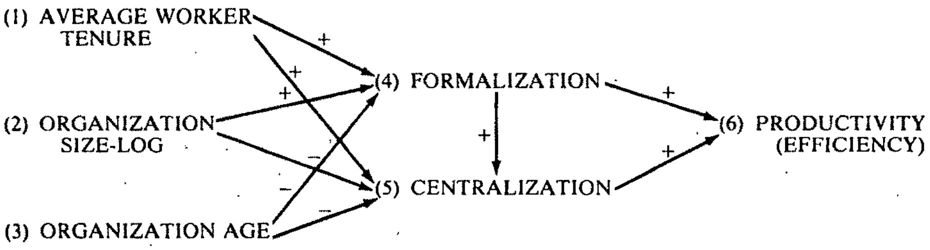
THEORETICAL MODEL

Structure as a Determinant of Productivity and Efficiency

Figure 1 shows the hypothesized theoretical model of the present study. In this model, productivity (number of clients served per week per line worker) and efficiency (number of clients served per week per $10,000 annual budget) are determined by the degree to which the organization's internal structure is centralized and formalized. It suggests that the structural dimensions of centralization and formalization have a direct and positive impact on the outcome criteria of productivity and efficiency.

FIGURE 1

Hypothesized Model of the Influence of Organizational Size, Age, and Structure on Productivity and Efficiency


(1) AVERAGE WORKER TENURE
(2) ORGANIZATION SIZE-LOG
(3) ORGANIZATION AGE
(4) FORMALIZATION
(5) CENTRALIZATION
(6) PRODUCTIVITY (EFFICIENCY)
+
+
+
+
–
–
–
+
+
+

Centralization refers to the degree to which the authority and decision making power in the organization is concentrated versus dispersed (Price, 1972). Formalization refers to the degree to which divisions of labor and procedures are explicit (e.g., written or espoused in the form of guidelines) rather than implicit (Price, 1972). The model in Figure 1 proposes that human service organizations that are more highly centralized and formalized are also more productive and efficient in terms of number of clients served and the cost of serving them.

When it is difficult to assess relevant differences in the quality of a product or service, Scott (1977) suggests that quantity of services performed may serve as an effectiveness criterion. He notes that for a large number of organizations, quantity indicators are the only "effectiveness" measures that are routinely or systematically collected. Whetten (1978) documents that central administrators of manpower programs view number of clients served (specifically, number of placements or referrals made) as the major "effectiveness" criterion on which funding decisions are based. Finally, Hannan and Freeman (1977) suggest that effectiveness and efficiency are probably closely related for organizations that face resource constraints.

Justification for the positive effects of increased centralization and formalization on productivity and efficiency rests on research by Hage (1965), Price (1968), Mott (1972), Molnar and Rogers (1976), and Whetten (1978). Mott (1972), in particular, reports positive associations between clarity of rules, policies, and guidelines and the amount of productivity in the organizations he studied. Hage (1965), in his axiomatic theory of organizations, argues that greater formalization is associated with greater productivity and efficiency due to the fact that it minimizes decisional uncertainty. Molnar and Rogers (1976) report (for a sample of 110 public agencies in Iowa) that those that are more formalized both receive and supply more resources (from and to other organizations in the community) than do those that are less formalized. Whetten (1978) reports that a high degree of formalization is significantly associated with a higher level of output.

In Whetten's (1978) research on 67 manpower agencies, a centralized decision making structure is observed to be even more strongly associated with level of output (here, productivity) than is formalization ($r = .41$ vs. .31). Whetten concludes that "if an administrator centralizes the decision making process, output will increase. . . ." Reasons for this, similar to those for formalization, rest on the reduction of decisional leeway at the service delivery level. Similar conclusions are reported by Price (1968) and, to some extent, by Mott (1972).

In a highly centralized organization, workers at the service delivery level are allowed minimal say-so in the decision making process of the organization: for example, in regard to the setting of policies and hiring of new employees. On the one hand, this frees the workers from concern with larger organizational issues and increases the time available for direct service delivery. Direct service workers in a centralized organization therefore have more time to deal directly with clients. Logically, productivity, or the number of clients served, should be enhanced. On the other hand, these same workers are likely to resent their lack of opportunity for decisional participation (Holland, 1973; Pondy, 1977). Whetten (1978) reports that although centralization facilitates productivity, it also produces a dissatisfied staff. To the extent that a "satisfied" staff is a necessary component of *effective* service delivery, it may be the case that the goals of productivity/efficiency are in conflict with those of service effectiveness.

This, in fact, is a very real possibility and, for this reason, will be discussed later.

As shown in Figure 1, formalization is proposed to have a positive effect on the extent to which the authority and discretion of the line workers are centralized. The explicit specification of divisions of labor and operating procedures among line workers reduces the discretion and authority exercised in carrying out their job tasks. Workers in more formalized settings simply do not have as much decision making power over what they do or how they do it as do workers in less formalized settings. A higher degree of formalization, therefore, facilitates the concentration of power into the hands of those who specify procedures and divisions of labor, i.e., the decision makers in the hierarchical structure.

Size and Age as Determinants of Structure

Size—The organizational literature is fairly consistent in reporting a negative association of organizational size with centralization of authority (Pugh, Hickson, Hinings, & Turner, 1969; Blau, 1970). As shown in Figure 1, a negative relationship is hypothesized here as well. Size, typically indicated by number of organizational members (usually employees), is conceptualized by Blau (1970) as inevitably leading to an increase in structural differentiation (Blau & Schoenherr, 1971). As an organization becomes more differentiated (e.g., into more divisions and departments), decision making authority necessarily becomes more dispersed. (For a contrasting viewpoint, see Hall, 1963, and Hall, Johnson, & Haas, 1967.) As additional organizational units are created, authority migrates away from a single administrative chief to at least a number of lower level administrators in charge of the various subunits. The degree to which the authority of the line worker is affected by this process, however, is seldom addressed. Although the organization *as a whole* may exhibit a less centralized authority structure with an increase in number of employees, little is known regarding the effects of this process on the direct service worker's participation in organizational level decision making.

It should be noted that extrapolation from previous results to the present study may be invalidated by the generally small size of the organizations in the present sample. As shown in Table 1, one of the organizations has as few as 14 employees. Fully two-thirds of them have 1,000 or fewer. Thus, previously reported results based on organizations of 25,000 or so employees such as those obtained by Pugh et al. (1969) may be inapplicable here. Pugh et al. (1969) report, in addition, that public organizations have considerably more centralized authority structures than do private ones, regardless of size. In the present sample, therefore, a rather weak association might be expected—of whichever direction—between size and centralization of authority. Finally, it is noted that the observed effects of organizational size on organizational structure typically are reported to be curvilinear in form (Child, 1973; Mileti, Gillespie, & Haas, 1977). Given

TABLE 1
Characteristics of the Sample

Variable	*Mean*	*Standard Deviation*	*Minimum*	*Maximum*
Organization age (years)	45.76	37.34	2	134
Organization size (total workers)	303.17	653.12	14	3292
Average worker tenure	4.48	2.79	1	12
Centralization	47.72	10.04	28	69
Formalization	41.70	6.70	28	56
Productivity (clients/week/worker)	27.60	17.46	5	82
Efficiency (clients/week/$10,000)	35.65	45.85	7	228

the restricted range of sizes represented by the 30 human service organizations in the present sample, it may be the case that an increase in size leads *initially* to an increase in centralization up to some point at which it turns downward and leads to a decrease. In light of this possibility, the initial analysis here includes size in both its log-transformed and raw form modes.

The relationship between size and formalization is reported consistently in the literature to be positive (Hall et al., 1967; Pugh et al., 1969; Kimberly, 1976). A positive association is hypothesized here as well (see Figure 1). Greater size leads to greater development and utilization of formalized rules, procedures, and guidelines. The reasons for this reflect the increased need for clarity, predictability, and planning prompted by the presence of large numbers of employees (Tracy & Azumi, 1976).

It is important to note that formalization is the aspect of organizational structure generally associated in the public mind with "bureaucratic red tape." Popularly damned as a nuisance and a hindrance, it represents an aspect of bureaucratic organization that assures a minimum of fairness and consistency in the treatment of employees and clients alike. In this light, it is important to note recent findings by Anderson (1977). He reports a moderate degree of formalization to be associated with *higher* job satisfaction and *fewer* feelings of alienation among 200 direct service workers in 19 service organizations.

The specification of rules and procedures may be viewed, therefore, as reducing certain kinds of work-relevant uncertainty and, in doing so, facilitating the conduct of a worker's job. To the extent that very small organizations lack such specifications and very large ones have too many of them, it can be expected that they will be both less productive and less efficient than will medium size organizations with a moderate degree of formalization.

Age—Organizational age or "time" is a relatively neglected topic in the literature on human service organizations (Moos, 1974; Kimberly, 1976). Stinchcombe (1965) suggests that this is to be expected because age is largely an irrelevant concept for understanding organizations (also, Hall, 1963). Others, however, have found age to be moderately associated with aspects of structure (Pugh et al., 1969), admissions policies (Martin, 1978), and programmatic emphasis on rehabilitation versus custody (Kimberly, 1975). Heydebrand (1973) reports that among hospitals both higher quality and greater stability are associated with increased organizational age. Age of the organization is examined here as one aspect of organizational time that influences the organization's structure.

In a broader sense, Pfeffer (1977) suggests that the age and tenure distributions of organizational *members* be examined to determine the "time horizons" of an organization. Following his suggestion, staff tenure (or the average length of employment of direct-service staff) is analyzed as a second dimension of organizational time. Although "official" organizational records are likely to antedate the tenure of any given employee, the actual reference to "precedents" or previous actions or events depends to some extent on employees who have memories or habits of their own. In organizations with a more highly tenured staff, one can expect greater reliance on tradition or precedent than would be the case if all the staff were relatively new. To the extent, then, that greater "age" in general means greater knowledge, greater experience, and more extensive behavioral and cognitive repertoires, organizational age may be said to be reflected by the tenure of the employees.

As shown in Figure 1, the two dimensions of organizational time are hypothesized to influence formalization and centralization in opposite directions. Actual age of the organization, taken as evidence of the organization's previous success at adaptation, is expected to influence a *decrease* in both formalization and centralization (Pugh et al., 1969). With increased evidence of survival ability, older organizations may be expected to relax a bit. Confidence in the ability of the system to produce desired results is hypothesized, with the passage of time, to lead to a decentralization of the decision making process and to somewhat lesser emphasis on formalized rules and procedures.

A higher average staff tenure, on the other hand, is expected to have the opposite effect. In the present case, where tenure data are taken from direct service workers, long term employment in a low-level organizational position is expected to encourage greater reliance on formalized rules and procedures and a more centralized authority structure. This process may be conceptualized as the institutionalization of "maintenance structures" in order to preserve a steady state (Katz & Kahn, 1966). Thompson (1967) states that "organizations abhor uncertainty," suggesting that people abhor uncertainty in organizational situations. Workers may contribute, therefore, to the institutionalization of maintenance structures over time by following the "well-worn paths" described by March and Simon (1958) in solving organizational problems. Formalization and centralization reflect stability, lack of uncertainty, and lack of contingencies. As workers fall into their slots over the years, they feel comfortable with a steady state situation and thereby contribute to it, maintain it, and support it.

A related consideration is suggested by Kanter (1977). Direct service staff who remain in a front-line position for an extended period of time may be persons who lack attributes necessary for promotion or who have been repeatedly passed over for advancement or promotion (as a result, for example, of institutionalized sexism or racism that limits opportunity and discourages ambition). Kanter (1977) reports that workers who remained locked in to low level organizational positions tend, over time, to become rigid, to encourage turf development, and to oppose innovation and change. Such workers, therefore, are likely to contribute through their behavior to the creation and maintenance of a more formalized and centralized organizational structure. (It is possible that the causal ordering here is either the reverse of what is proposed here [i.e., with centralization and formalization influencing length of tenure] or else reciprocal in nature. In short, a highly centralized and formalized structure may result in a lack of organizational fluidity and thus chances for advancement by direct service workers. Weick [1977] and Pondy [1977] caution against "too much stability" as a liability to the long term adaptability of the organization.) Whether or not this is an otherwise desirable occurrence, the model in Figure 1 suggests that it will contribute indirectly to a higher degree of organizational productivity and efficiency.

At any rate, results of the present analysis will allow an assessment of the relative effects of the age of the organization per se versus the average tenure of the staff as predictors of structure (and ultimately productivity and efficiency) in human service organizations. (Because "older" organizations have greater *potential* for staff with longer tenure, it may be the case that consequences sometimes attributed to years of operation are, instead, consequences of staff seniority or tenure, or vice versa. While the two variables no doubt are highly collinear in some organizations, they are conceptually distinctive aspects of organizational time.)

METHOD

Each of the 30 organizations in a large, mid-western city selected from the 34 that agreed to participate in the study had at least one administrative level above the line workers who had direct contact with the clients. The selected organizations provided the following: corrections (2), services to the aged (1), children's services (7), drug abuse treatment (2), family counseling (6), welfare services (5), mental health services (3), services to the mentally retarded (1), and services to the physically handicapped (3). Each of the organizations attempted to improve the affective, cognitive or behavioral functioning of their clients and used a variety of intensive technologies (Thompson, 1967) to produce those changes. The 408 workers participating in the study were well educated (89 percent college graduates and 52 percent with a master's degree or above), with the majority of the degrees held in the social sciences or "helping" professions (88 percent). The most frequently occurring degree was a master of social work (35 percent).

All of the workers in each organization whose primary job responsibility involved direct interaction with clients for the purpose of facilitating changes in these clients responded to the questionnaire, except that in two correctional institutions, a medical-psychiatric hospital, a state mental hospital, and a large community service organization, the questionnaires were administered only to workers in the social services departments. The questionnaires were completed anonymously during staff meetings and returned unsigned during the meeting. Organizational scores for formalization and centralization were derived by arithmetically averaging the worker responses within each organization.

Centralization was measured with the participation in decision making scale developed by Hage and Aiken (1967) and the hierarchy of authority scale developed by Hall (1961). Formalization was measured with the division of labor and procedural specifications scales developed by Hall (1961). For both dimensions of structure, items were combined within each pair of scales and scored so that possible values for centralization and formalization ranged from 0 to 100. Split-half reliabilities calculated for each scale were .88 for participation in decision making, .89 for hierarchy of authority, .75 for division of labor, and .79 for procedural specifications. The total number of worker responses for establishing scale reliabilities was 408.

Average worker tenure was calculated by arithmetically averaging the number of years all present workers had been with the organization. Organizational age was simply the number of years the organization had been in existence. These are two measures of "time" in an organization, with the former measure hypothesized to have greater significance for internal organizational characteristics, such as structure, and the latter having greater significance perhaps for certain relationships with the environment important to funding, legitimation, or marketing.

Organization size was measured both as the total number of workers in the organization and as a natural log transformation of the number of workers in the organization. The log transformation was conducted because of the expected curvilinear relationship between size and structure as reported by prior investigators (Child, 1973; Mileti et al., 1977).

The measure of productivity consisted of the average number of different clients served by each line worker per week. A measure of efficiency was calculated as the number of clients served per week per $10,000 annual budget (Goodman & Pennings, 1977; Price, 1968). Although it is emphasized that these variables certainly are not indicators of the quality of service being delivered, the "accountability controversy" (Glisson, 1975) dictates a need for such data if only for purposes of description and discussion. The absence of productivity and efficiency data serves to increase unfounded speculation and misdirect inquiry into accountability.

RESULTS

Table 1 presents the means, standard deviations, and ranges of the variables measured. The productivity and efficiency data are of particular note because of the present dearth of such information in the literature. The frequency distributions of the average number of clients served per week per worker and of number of clients served per week per $10,000 budget indicate considerable differences among organizations. The effects of type of service organization (residential vs. nonresidential, physiological vs. psychological, etc.) on productivity and efficiency were controlled for by standardizing the measures in week-units. Simply because of the different rates of turnover, an organization providing residential care could service significantly fewer clients on a yearly basis than if it provided only outpatient care. On a weekly basis, however, the differences according to type of organization have an insignificant impact on productivity and efficiency. For example, one correctional institution had the highest productivity score (82 clients/week/worker), but the other correctional institution scored below the mean (26 clients/week/worker). Also, one organization delivering welfare services had the third highest efficiency score (110 clients/week/$10,000), and another tied for the lowest (7 clients/week/$10,000). An exception to the observation that type of organization had no effect on productivity is that the two least productive organizations (5 and 8 clients/week/worker) both treated drug abuse problems. However, the organizations also were similar in structure (with scores of 36 and 31 on centralization; 39 and 31 on formalization), which was significantly correlated with productivity across the total sample. Also, there was a greater discrepancy in the two organizations' efficiency scores (20 and 11 clients/week/$10,000), with ordinal rankings of 16 and 24 in the sample of 30.

The discrepancies in any organization's productivity and efficiency rankings depend on the size of its budget per staff, which is determined, to some extent, by salaries. For example, a child guidance clinic was more productive than nine other organizations (21 clients/week/worker) but, because a number of psychiatrists were employed as line workers, it along with one other organization proved to be the least efficient of all the organizations (7 clients/week/$10,000). The richness of these productivity and efficiency data, in short, provide convincing evidence that this is an area long overdue for close examination.

As shown by the Pearson correlations in Table 2, neither organizational size, age, nor average worker tenure is significantly related to either productivity or efficiency, although the two structural dimensions are positively correlated with both. Also, organization size-log and average worker tenure are positively correlated with both structural dimensions, but organization size and organization age are not correlated with either structural dimension. The very high correlation (.79) between formalization and centralization supports the hypothesized relationship between the formalization of divisions of labor and procedures and the centralization of authority and discretion at the line worker level.

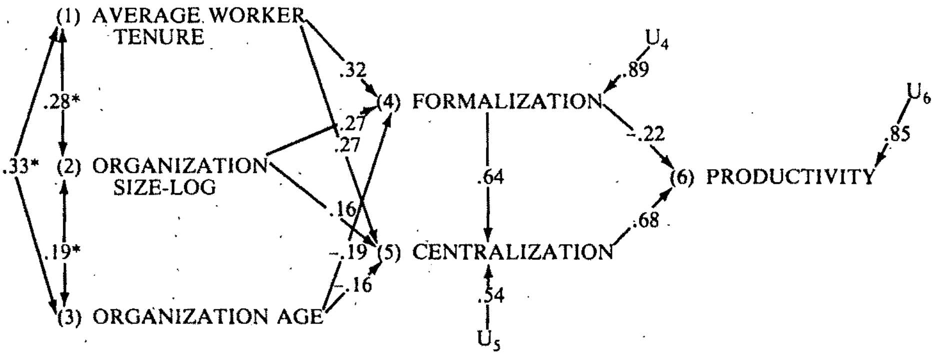
Figure 2 presents the results of a path analysis of the hypothesized model which decomposes the zero-order correlations into direct and

TABLE 2
Pearson Correlation Matrix ($N = 30$)

	(1)	*(2)*	*(2a)*	*(3)*	*(4)*	*(5)*	*(6)*
(1) Average worker tenure							
(2) Organization size-log	.28						
(2a) Organization size	.05	.79*					
(3) Organization age	.33*	.19	.15				
(4) Formalization	.34*	.33*	.01	-.03			
(5) Centralization	.49*	.42*	.11	-.05	.79*		
(6) Productivity	.15	.19	-.08	.07	.32*	.50*	
(7) Efficiency	.01	.21	-.10	-.07	.30*	.41*	.70*

*$p < .05$

FIGURE 2
Path Analysis of Hypothesized Model with Productivity as an Outcome Variable



*Zero-order correlations

indirect effects. Centralization has a very large, positive, direct effect on productivity as predicted; formalization has an unpredicted smaller, negative, direct effect. Because of the high correlation between centralization and formalization, formalization is suppressing a portion of the variance in centralization uncorrelated with productivity. In removing the variance in centralization associated with formalization, centralization's impact on productivity is increased. Formalization, as a result, negatively affects productivity after the variation explained by centralization has been accounted for. This indicates that limiting the authority and participation in decision making of line workers increases the number of clients they serve, if formalization is held constant, but that increasing formal divisions of labor and procedural specifications slightly decreases the number of clients served by each worker if centralization is held constant. However, formalization has the proposed positive, direct effect on centralization and, therefore, a positive, indirect effect on productivity of .44. The total effect of formalization on productivity, then, is also positive as suggested by the zero-order correlation. As divisions of labor and procedural specifications are formalized within an organization, the power and discretion of the line workers are decreased. They apparently become less involved in administrative or management problem solving and are freed to devote their time to clients. Although this increases productivity, it is not an indicator of effectiveness. Formalization, in fact, may have a negative impact on effectiveness as suggested in an earlier analysis (Glisson, 1978).

Of the three predictors of structure included in the model, average worker tenure had the greatest impact on both formalization and centralization. This predicted, positive effect indicates that the longer an organization employs the same workers, the more rigid the structure becomes. Contrast this with the finding that the absolute age of an organization had a smaller but negative effect, as hypothesized, on structure. It seems, then, that the length of time the same workers are with an organization is a more meaningful indicator of organizational age, particularly if internal organizational functioning is the focus.

When log transformed, organizational size shows the proposed, positive effect on formalization and, also, an unexpected positive, although small, effect on centralization. The log transformation was necessary because the relationships between size and both formalization and centralization were found to be curvilinear, with the impact of size leveling off at around 200 workers and a slight downward trend beginning at around 400 workers for both variables. The fact that the majority of the sample had less than 400 employees could therefore explain the discrepancy between the present findings and other studies reporting a negative relationship between size and centralization. This curvilinear relationship may be explained by the tendency of departments, divisions, or offices to become the units of reference for workers as organizations become larger. That is, the structural variables measured here cease to be a function of total size as departments, divisions, or offices begin to assume a degree of autonomy within larger organizations and become the units of reference for policy and planning.

It should also be emphasized that, although size-log and centralization enjoyed a significant zero-order correlation, the direct effect of size-log on centralization proved negligible after the variation in centralization explained by formalization was accounted for. The high correlation between size-log and centralization, therefore, could be interpreted as an artifact of their shared high correlations with formalization.

The adequacy of the path model was tested by predicting correlations that were not constrained to be reproduced automatically by the path model, using the basic theorem of path analysis, $\hat{r}_{ij} = \Sigma p_{iq} r_{jq}$, where r equals the correlation coefficient, p equals the path coefficient, the subscripts i and j denote two variables in the model, and q ranges over all variables from which paths directly effect x_i (Land, 1969). The initial subscript of the path coefficient indicates the dependent variable, and the second subscript indicates the independent variable in that particular direct causal relationship. The path model should enable the investigator to reproduce, closely, correlations that were not used in the derivation of the path coefficients. The crucial correlations to be reproduced are between those variables that have no predicted direct effect on each other, excluding correlations between two exogenous variables, which are assumed to be known. Table 3 shows the observed and predicted correlations for the hypothesized path model. The crucial correlations are r_{16}, r_{26}, and r_{36} and the predicted correlations deviate from the observed by .10, .03, and .10, respectively. The model reproduces the correlation matrix fairly well, but there is no test of the degree of fit to determine if the model is the "right" model. The adequacy of the model in explaining variance was supported using the test reported by Kim and Kohout (1975), where $L = -1.4974$ with 3 degrees of freedom, indicating that the variance explained by the restricted model did not differ significantly from that explained by the general model. The theoretical rationale underlying the model, however, is the true test of the model. That rationale combined with the ability to reproduce accurately the observed correlations and to explain variance provides support for the specified model.

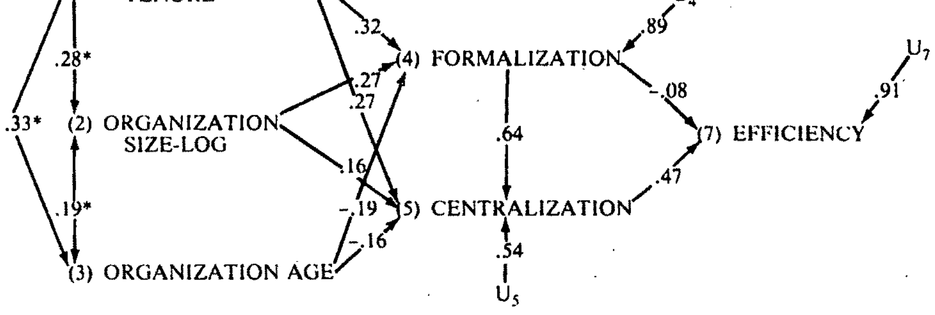
TABLE 3
Observed and Predicted Correlations for Hypothesized Model in Figure 1

Observed r_{ij}[a]	*Predicted* $\hat{r}_{ij}$	*Difference* $\lvert r_{ij} - \hat{r}_{ij} \rvert$
$r_{16} = .15$	$\hat{r}_{16} = .25$	.10
$r_{26} = .19$	$\hat{r}_{26} = .21$	.03
$r_{36} = .07$	$\hat{r}_{36} = -.03$	.10

[a] Correlations constrained to be automatically reproduced by the model are not included. Those listed are the crucial correlations which determine the predictive ability of the model.

The model in Figure 3 shows efficiency, rather than productivity, as the outcome variable. It differs from the previous model only in the path coefficients from formalization and centralization to efficiency. These were

FIGURE 3
Path Analysis of Hypothesized Model with Efficiency as an Outcome Variable



*Zero-order correlations.

–.08 for the path from formalization and .47 for the path from centralization. This is the same pattern observed for productivity; centralization exhibits a larger, positive effect, and formalization exhibits a smaller, negative effect on efficiency. The sizes of the effects of both structural dimensions on efficiency, however, are substantially smaller than on productivity, with formalization having almost no impact whatsoever. The differences between the predicted correlations based on the efficiency model and the observed correlations are the same as for the productivity model except that the predicted correlation for r_{16} based on the efficiency model deviates from the observed by only .05, rather than by .10.

SUMMARY AND DISCUSSION

As suggested by Whetten (1978), present results confirm the importance of centralization of authority in accounting for quantity of organizational output. A highly centralized human service organization is likely to be highly productive and, to a lesser degree, efficient as well. A heightened reliance on formalized rules and procedures apparently facilitates concentration of decision making power in the hands of a few. (Rather than being alternative modes of organizational "control" as suggested by Pugh et al. [1969], formalization and centralization are apparently supportive of each other.) Further, it is this concentration of power that facilitates productivity and efficiency. It is emphasized, however, that the *direct* effects of formalization on productivity and efficiency are negative in direction, indicating that greater emphasis on formal rules and procedures has the direct consequence of reducing each. As previously stated, this negative direct effect results from the "net" suppression of the variance in centralization by formalization (Cohen & Cohen, 1975). To the extent that formalization enhances centralization, however, its overall impact on both output criteria is positive.

The findings suggest the conclusion that average staff tenure is somewhat more important than organizational age for understanding the origins of internal organizational structure. As hypothesized, older organizations are somewhat less formalized and centralized, whereas those with a more senior staff are somewhat more so. Because the two variables are positively associated with each other at the zero-order level ($r = .33$), their directional divergence in relation to structure suggests that they may be indicative of different theoretical concepts. Perhaps age of the organization is a reflection of its relationship with the environment (i.e., in terms of previous adaptive success), whereas average staff tenure provides clues as to promotional or advancement opportunities for first-line staff inside the organization.

As anticipated, the effects of size on structure proved to be curvilinear and, in relation to formalization, positive as well. Although the positive association of size and centralization was unanticipated, it may be accounted for by the limited range of variation on size of the organizations in the sample. As previously stated, the strong positive relationship between size and centralization among organizations of less than 200 was not observed in larger organizations and, in fact, changed to a slightly negative trend in organizations of more than 400. If this is the case, two substantive conclusions are suggested. First, to the extent that most human service agencies fall within the size-range exemplified by the present sample (from 14 to 3,300 with two-thirds under 1,000 employees), larger size in human service organizations results in an increase (rather than decrease) of centralized decision making procedures. Second, to the extent that other types of organizations (e.g., factories and businesses) typically are larger than the organizations in the present sample, results based on one type of sample may not be generalizable to other types. Present results underscore Kimberly's (1976) recent call for more careful studies of the consequences of size within intratypical versus intertypical samples of organizations.

The rather high association of the productivity and efficiency variables ($r = .70$) in the present sample is noteworthy. It suggests that, in large part, those organizations that are high producers are also cost efficient in their production activities. Or, viewed in light of the "economies of scale" concept (Price, 1972), it may indicate simply that increased volume of output reduces the per-unit cost of processing any given client or case.

Whetten (1978) criticizes the "resource theory" of organizational effectiveness (Yuchtman & Seashore, 1967) for failing to acknowledge that organizations typically must demonstrate efficiency in the use of previously received resources in order to secure additional ones. This illustrates the point that funding sources external to the human service organization are likely to pressure it to produce and to produce efficiently. In a production- and quantitatively-oriented society, organizations that can claim high productivity and cost-efficiency enjoy greater legitimacy in the public arena. As argued by Meyer and Rowan (1977), articulation of and compliance with the values expressed by the larger society assure an organization of goodwill, support, resources, and relative protection from external regulation (including evaluation) as well.

To the extent that high productivity and efficiency require high centralization of authority, however, an important dilemma prevails. As noted by many researchers, a high degree of centralization leads to staff dissatisfaction (Whetten, 1978), a lower quality of client service (Holland, 1973; Hage, 1974), and a diminished level of individual worker and organization-level development (Pondy, 1977). Weick (1977) notes that high adaptation in the short run—as indicated, say, by high productivity and/or efficiency—may actually prevent high adaptability in the long run. Certainly to the extent that a centralized power structure stifles worker experimentation, innovation, and openness to change, the chances for discovery of new and better methods appear minimal. The exclusion of professional staff from the decision making process, a characteristic of highly centralized organizations, is known to result in staff members' adoption of an apathetic orientation toward clients (Holland, 1973; Martin & Segal, 1977). One is hard-pressed, therefore, to make the case that a centralized authority structure contributes to a higher quality of services for clients.

Conflicts between the goals of quantity and quality of services have been noted by Seashore (1965), Freidlander and Pickle (1968), Mohr (1973), and Whetten (1978). Whetten (1978) reports that staff members' evaluation of their own organization's effectiveness (in providing services to clients) is significantly and negatively associated with the organization's productivity (or output) rate ($r=-.42$). Further, Whetten finds educational level of the staff (indicative of the "degree of professionalism") to be negatively associated with output ($r=-.25$). This result is replicated by present findings ($r=-.25$ for education of staff and productivity and -.30 for education and efficiency). Such correlations may merely reflect the oft-reported conflict between "professionalism" and "bureaucracy" in human service settings (Anderson, 1977). Professional staff may be oriented toward long term, in-depth "treatment," whereas funding agencies and administrators favor a short term, quick turnaround approach. Even if this is the case, it appears to constitute a genuine dilemma for the human service administrator.

Present results underscore the bind in which human service administrators find themselves. In regard to organizational well-being (e.g., survival, resource procurement, expansion, and growth), they are advised to emphasize productivity and efficiency. In regard to staff and client satisfaction, they are pressured to stress quality and effectiveness. Conflicting demands from their organizations' multiple constituencies force human service administrators into the political arena in the mere execution of their jobs (Walmsley & Zald, 1976). To the extent that resources continue to come from outside the organization, furthermore, administrators of service programs can be expected to be more responsive to pressures for productivity and efficiency than to those for quality and effectiveness (Rogers & Molnar, 1976). Conclusions such as this emphasize the need for more refined research on the correlates of effectiveness as well as efficiency. The identification of practice principles that facilitate high quality services in addition to organizational well-being are long overdue.

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The Role of Environmental and Behavioral Uncertainty as a Mediator of Situation-Performance Relationships[1]

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The causes and consequences of two types of uncertainty (environmental and behavioral) were investigated in a simulated job environment. Employees worked with a structuring or considerate leader, on a structured or unstructured task, and with or without a goal. The structuring leader and structured task produced greater certainty than the considerate leader or the unstructured task. Goal setting had no effect. The same independent variables and increased certainty resulted in higher performance.

Some of the most important factors that have been suggested to influence an individual's job satisfaction and job performance are the uncertainties one has about the surrounding environment and the uncertainties about the consequences of his behavior. Uncertainty about the surrounding environment is described as unpleasant and detrimental to effective decision making and performance. MacCrimmon and Taylor's (1976) recent review discusses these issues and the ways in which people attempt to reduce this uncertainty. Behavioral uncertainty also seems to limit effectiveness. For example, a number of studies such as Mitchell, Smyser, and Weed (1975) have shown that people with an internal locus of control (people who see the environment as responsive to their actions) have higher satisfaction and better performance than do those with an external locus of control (people who see little relationship between their

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actions and what happens to them). The purpose of the present research was to investigate more thoroughly the causes and consequences of these two types of uncertainty (i.e., environmental and behavioral). That is, to what extent can environmental and behavioral uncertainty serve as a mediator between the environment and behavioral and attitudinal outcomes?

BACKGROUND RESEARCH

There are at least three major sets of variables that influence performance and satisfaction for which a reduction in uncertainty may serve as a mediating psychological explanation. First, there are those variables that might be described as organizational policies. A study by House and Rizzo (1972) reported that organizational policies such as a mechanistic management strategy led to less role ambiguity. Included here also would be factors such as goals, targets, and objectives. The research on goal setting (Locke, 1968) shows that a specific goal results in better performance than does a vague or ambiguous goal (Latham & Yukl, 1975; Steers & Porter, 1974). Although no studies have explicitly examined measures of uncertainty reduction as one of the mediating psychological explanations for these latter results, it seems that clear, specific goals should reduce uncertainty.

A second set of variables important for satisfaction and performance is the characteristics of the task. For example, a number of studies have shown that role ambiguity leads to dissatisfaction and lower performance (Brief & Aldag, 1976; Szilagyi, Sims, & Keller, 1976; Miles, 1976). Other theories, such as Fiedler's Contingency Model, define low task structure as less favorable and less certain for a leader than high task structure (Fiedler, 1967). Thus, there is some suggestion in the literature that low task structure may cause ambiguity and uncertainty and that these factors may limit job satisfaction and performance.

Finally, there are some interpersonal factors that influence satisfaction and performance. Probably the most important of these is the behavior of the leader. Given the major dichotomy of a task oriented style or an interpersonally oriented style, it would seem that task orientation affects uncertainty variables more than does an interpersonal style. A study by House (1971), for example, reported a correlation of $-.41$ ($p < .05$) between initiating structure and role ambiguity (no data were provided for consideration). It also is fairly clear that the task oriented style positively influences performance. Korman's review (1966) reports that of 26 studies reviewed, 20 showed a positive relationship between structuring behavior on the part of the leader and the subordinates' performance. Stogdill's handbook (1974) reports the same relationship for 13 out of 18 studies. A more recent review (Schriesheim & Kerr, 1977), shows less consistency with these findings, but the conclusion that structuring behavior impacts performance is still viable.

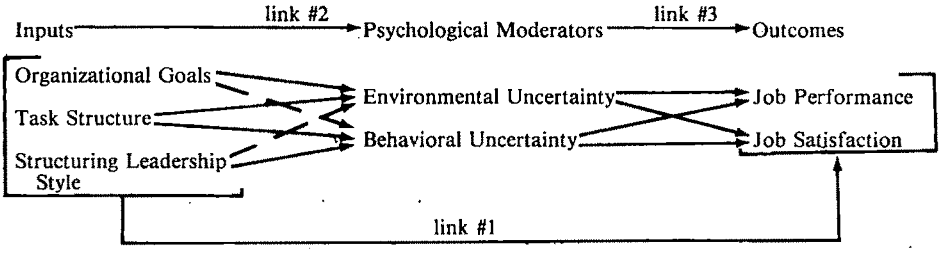
Much of the reviewed literature that looked relevant to the present topic used measures of role ambiguity. These data caused some problems in the current study for a variety of reasons. First, role ambiguity may be only slightly related to uncertainty, as defined here. For example, Schuler, Aldag, and Brief (1977) report significant correlations of -.14 to -.49 between role ambiguity and expectancies in five separate samples. Because the study reported here used an expectancy type measure as one estimate of uncertainty, these data suggest that previous support for the hypotheses is only indirect: these constructs show at best 25 percent common variance.

The research on role ambiguity highlights another problem. Although some of the studies look at direct causes or consequences of ambiguity (House & Rizzo, 1972; House, 1971; Schuler et al., 1977; Miles, 1976), most of the research uses role ambiguity as part of a moderator analysis of leader or task variables related to outcome variables like performance or satisfaction (Szilagyi et al., 1976; House, 1971; House & Dessler, 1974). Korman has defined this moderator relationship as "an independent variable whose dependent variable happens to be the correlation between two other variables (e.g., some leader characteristic behavior and some criterion measure)" (1974, p. 193). The study reported here is not concerned with this type of relationship. It looks at uncertainty as a mediator—an intermediate step—between the independent variables and the dependent variables. It does not explore the moderator or contingency type relationships that are prevalent in the literature.

In reviewing the above research on all of the factors that affect satisfaction and performance and for which uncertainty might serve as a *mediating* explanation, a number of research omissions were noted. First, few studies attempted to ascertain the additive or interactive effects of combinations of these variables. For example, none determined whether goal setting combined with a task oriented style is more effective than goal setting combined with a considerate style. A second problem is that most of the studies reviewed are correlational in nature. Very few studies, for example, manipulate leadership style or the structure of the task. This methodology limits the ability to make causal inferences about these relationships. A third issue is that very few studies have actually looked at the uncertainty variables as mediators. What is needed is research that shows the causes of uncertainty and its consequences.

FIGURE 1

A Model of the Causes and Consequences of Psychological Uncertainty



With these omissions in mind, a model was developed to describe the relationships that might exist, and an organizational simulation was designed to test the model. Figure 1 shows the model.

It is suggested in Figure 1 that all three of the input factors will influence satisfaction and performance (link #1). That is, specific goals (when compared to no goals), a structured task (when compared to an unstructured task), and a structuring leadership style (when compared to a style with little structure) increase performance primarily and satisfaction secondarily. Moreover, it is hypothesized that these three input factors influence the psychological mediators (link #2). Goals should have a major effect on environmental uncertainty, and the leader's behavior should have its main effect on behavioral uncertainty. Task structure should influence both variables. Finally, we would expect the uncertainty variables to influence the performance and satisfaction criteria (link #3). A high level of uncertainty should result in low satisfaction and performance.

The research thus is an attempt to learn three things. First, do the independent variables have distinct and causal impacts on uncertainty? Second, do the independent variables have distinct and causal impacts on the criteria? And, third, can uncertainty serve as a mediator for the independent variable-criteria relationships?

METHOD

Subjects

The employees were solicited through newspaper advertisements offering part-time employment. This procedure was used so that the research situation would be similar in most respects to a real part-time job hiring situation. The work involved looking at blueprints of houses and making calculations and measurement conversions for raw material estimates. A preliminary screening test was administered in order to eliminate the extremely high and low ability candidates. The ability measure also was used in the data analysis as a covariate in order to adjust within-cell and between-cell variance in performance due to ability differences. In addition, only those candidates who were between the ages of 18 and 25 were hired. Most had had one to two years of college. From that pool, 64 subjects were randomly selected and then randomly assigned to the 8 experimental conditions. There were two levels of task structure (ambiguous, structured), two levels of leader style (high IS-low CONS and low IS-high CONS), and two levels of goal setting (no goal, specific goal), resulting in a $2 \times 2 \times 2$ factorial design.

Procedure

After the employees were screened, hired, and assigned to their respective treatment conditions, their supervisor (a confederate) made a telephone contact and arranged the employees' work schedule. The work setting consisted of tables, chairs, and partitions with no more than two employees working at any one given time. Although the two employees were assigned to the same combination of treatment conditions, they worked independently of each other with a partition between them. This allowed the employees to observe and perceive the leader's style and interaction with other subordinates as well as to experience the impact of that style personally. Each work session was divided into two parts, the first being a learning period (LP) in which the subjects were able to become familiar with the task and master the operations and calculations. Pilot testing of the task indicated that the average worker required 2½ hours to become acquainted with the materials and procedures, after which performance was less dependent upon the learning of the task. The second phase of the work condition, hereafter called the goal period (GP), introduced the goal-setting treatment. Here half the subjects were given the general instruction of "do your best," and the other half were assigned specific and moderately difficult goals.

At the completion of the second work session, the employees were given a questionnaire as part of the work assignment. The questionnaire asked them to respond to conditions about the work, the organization, their supervisor, etc. Included were manipulation checks for leader style and task structure, measures of satisfaction, and perceptions of uncertainty and expectancy. They were paid $2.50 per hour for their work. Debriefings occurred after all 64 employees had completed their work assignments. None of the subjects indicated any suspicion that the project was a research study rather than a part-time job.

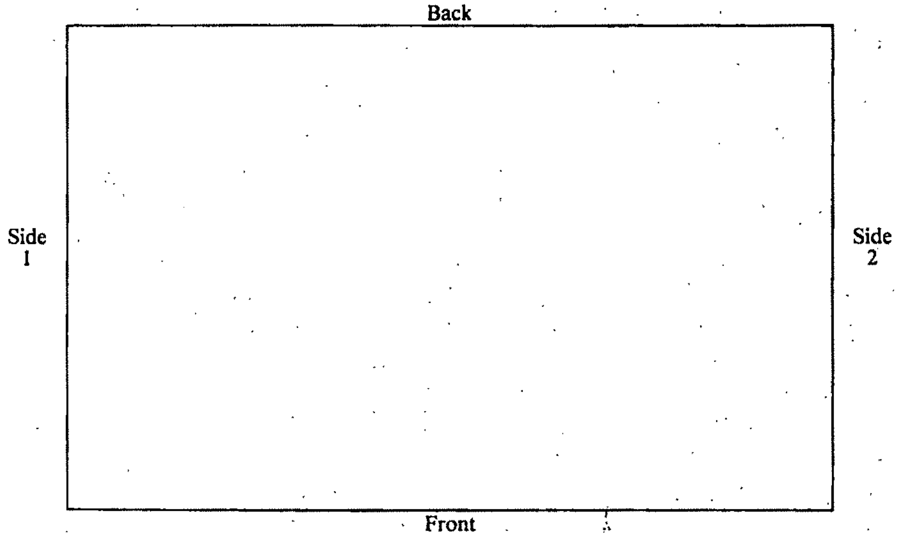
Description of Tasks

The task was designed specifically for this study and consisted of a set of five simple blueprint drawings (see Figure 2 for a sample). Each of the five drawings had three alternative floor plans, as well as a side view and an end view. The work assignment for the drawings had three basic components: (a) to draw one of the floor plans on to the "top view" to scale, (b) to calculate the floor space, wall space, and total for each room and house, and (c) to convert those to full scale (square feet) values and then to foreign measurement units. Each drawing had a work sheet attached. Figure 3 illustrates the work sheet for the ambiguous task.

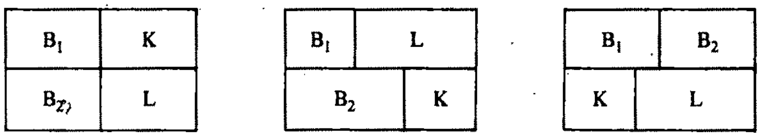
The description given was that "the blueprints are simple designs for the construction of low-cost housing for underdeveloped countries. We are attempting to determine if advisors in those countries who have no training or skill in this area will be able to read, understand, and help people utilize the given information. Your work on these blueprints and your responses to questions afterwards will enable us to make better decisions about how to design blueprints and present information in these underdeveloped countries."

FIGURE 2
An Example of a Blueprint

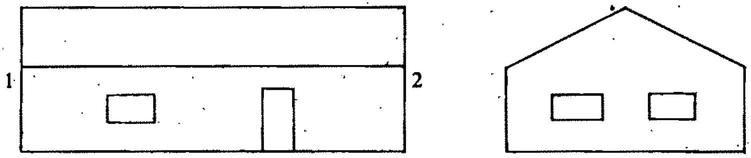
PLAN 1



TOP VIEW
SCALE 1/8″ = 1′-0″



FLOOR PLANS
SCALE 1/4 OF TOP VIEW SCALE



FRONT VIEW
SCALE 1/16″ = 1′-0″

SIDE VIEW
SCALE 1/16″ = 1′-0″

As an additional source of help, the employees were given an information sheet that contained conversions from (a) fractions to decimals, (b) scale measures to square feet, and (c) inches and feet to foreign measurement units.

FIGURE 3
Work Sheet for the Ambiguous Task

WORK SHEET
Country—Plan 1

I. Floor space		Verification Range	
B_1		B_1	18.0- 30.0
B_2		B_2	25.0- 60.0
K		K	15.0- 40.0
L		L	30.0- 70.0
Total		Total	80.0-200.0
II. Interior Wall Space			
B_1		B_1	30.0- 90.0
B_2		B_2	50.0-140.0
K		K	40.0-110.0
L		L	60.0-150.0
Total		Total	200.0-500.0
III. Exterior Wall Area			
Sides (Total)		Sides (Total)	100.0-250.0
Triangle area		Triangle area	15.0- 35.0
Total exterior wall area		Total exterior wall area	115.0-280.0

Independent Variable Manipulations

Task Structure—The same set of plans was used in both the structured and ambiguous conditions, with the differences in structure being accomplished by providing (or not providing) specific cues that corresponded with previously-established criteria for the structure dimension (Shaw, 1963). The specific cues were: (a) feedback, (b) multiplicity of solutions, (c) solution verifiability, and (d) direction clarity. Feedback was built into the work sheets (see Figure 3) and varied between the two tasks as to how frequently it occurred in the work process. The structured task condition had feedback at each step in the performance of the task, whereas the ambiguous condition received it only at the completion of major blocks in the task process (i.e., after the completion of five or six task computations). Solution verifiability for the structured task was provided at frequent intervals and within narrow and specific parameters. For the ambiguous tasks, verifiability was within very broad and general parameters. Direction and product clarity for the structured task was cued by defining specifically what should be done first, second, etc., and by giving a definite description of what the finished product would look like.

In the structured task condition employees also were told which house plan to start on, which floor plan to use, and which foreign measurement to convert to. A step-by-step set of instructions accompanied each drawing, and the work sheet allowed for a filling in of the blanks throughout the task. The ambiguous task allowed for many options and let the employees choose where to start, how to proceed, etc.

Some summary comments about the task are needed. A major purpose of this study was to provide tasks that differed with respect to structure but were constant on all other dimensions and had performance scores that were comparable for purposes of analysis. A check for homogeneity of variance for performance scores on each task was conducted, and this test supported the performance score comparability intention. Thus, it can be said with fair confidence that the task varied in structure but not substance or content. This point is important when one considers that most studies looking at different task structures are also looking at different tasks, and the results are, therefore, uninterpretable due to this confound.

The task needed was not only one that met the above criterion but also one that made sense as part-time employment and was similar to some extent to other real world tasks. The basic operations involved are mathematical in nature and similar to many computing, coding, accounting, or clerical tasks found in today's organizations. As mentioned earlier, none of the employees indicated that they saw the work as anything other than part-time employment, and many of them indicated an eagerness to be employed again if any other similar work was needed.

Leadership Style—The leadership style was manipulated by training three different leaders to each role-play two different leadership styles: (a) high on consideration, low on initiation of structure, hereafter called the considerate leader (CONS) and (b) low on consideration, high on structure, hereafter described as the structuring leader (IS). These two styles were chosen for two reasons. First, they are the most frequently cited dimensions in the leadership literature. The results should, therefore, be relevant for a large portion of the leadership literature. A second reason for choosing these styles requires more discussion. Much of the leadership research using these dimensions shows that these two dimensions frequently are correlated and that the high consideration, high structuring leader often is most effective (Schriesheim & Kerr, 1977). The problem presented by this research is that when one dimension (either structuring or consideration) is correlated with some mediator (e.g., uncertainty) or criterion (e.g., performance), the interpretation of the correlation is confounded by the fact that the two leader behavior dimensions are correlated. By establishing leadership conditions in which the leader is clearly high on one dimension and low on the other, it is possible to assess cleanly the independent effects of these two leadership behavior dimensions.

In order to maintain independence between the structure inherent in the task itself and the structure imposed by the leader on the task, it was necessary that the leader's behavior generate a climate or atmosphere of structure rather than create any actual changes in the task itself. For example, the condition consisting of specific assigned goals, a structured task, and initiation of structure leadership differed from the condition with specific goals, a structured task, and the considerate leader *only* on the leader dimension. In this way, confounding of the independent variables was minimized. For this reason, the IS and CONS behavior on the part of the leader was limited to where to sit, when to start, a push for production, etc. For example, the instructions for the structuring leader told him to (a) "check up continually to make sure the others are working as hard as possible," (b) "assign members where to sit," (c) "push them to greater effort," (d) "let them know you expect them to do better than any other group," and (e) "let them know you have worked out the procedures in the best possible way." The considerate leader, on the other hand, was told to (a) "manifest a high interest in each person," (b) "show concern for their comfort and well-being," (c) "strive for harmony and good relations," (d) "show a high level of respect," and (e) "be considerate of their feelings." The leaders were given a sample dialog that gave specific examples of appropriate behavior and had the opportunity to practice their styles in pilot sessions. Each of the three trained leaders served in the same number of IS and CONS conditions.

Goal Setting—Pretesting with the task established that nearly all employees could learn the procedure, computations, etc., during a learning period of 2½ hours. In addition, about 35 percent could complete the same number of drawings and computations in the goal period as they had in the learning period *plus* 1½ additional drawings (and the related computations). Therefore, the goal manipulation was accomplished by assigning the goal condition subjects a number of drawings and related computations equal to the first phase (LP) performance plus an additional 1½ drawings, all to be completed in the goal period (GP).

In the no-goal condition, subjects were told to "do your best" on the task. This goal was presented without mention of a specific degree of accomplishment. Order effects were controlled by assigning the structured condition the same sequence of drawings selected by a matched person in the ambiguous task condition.

Measures: Methodological Checks

Ability—This variable was measured by the Wonderlic Personnel Test (Form V). The test was used both as a screening technique and as a covariate in the analysis of covariance procedure. The Wonderlic was used for a variety of reasons. First, it includes items requiring mathematical computations, analysis of geometric figures, and spatial relations. All of these seemed relevant for the task. Second, the test is widely used in industry as a general screening device for employment (Anastasi, 1968). And, finally, the variance in the overall score has been clearly shown to be partially related to deduction and numerical fluency (Guion, 1965). Test-retest reliabilities with different forms of the Wonderlic have yielded correlations ranging from .82 to .99 and split-half correlations of .88 to .94. With education level as the criterion, validity coefficients ranging from .95 to .99 are reported (Wonderlic, 1970). The employees were told that taking this test was part of their job application.

Manipulation Checks—The task structure-ambiguity conditions were compared by looking at the subjects' perceptions of task structure using nine items with an 8-point scale. Examples are, "How clear and understandable were the instructions; to what extent were you able to tell immediately what to do first, second, etc.; to what degree are there several possible solutions to the task?" The rest of the items are available in Weed (1978).

The measure of leadership style was a modified form of the LBDQ XII. This modification was based on some previous analyses (Brown, 1967; Weed, Mitchell, & Moffitt, 1975). Five-point Likert-type scales were used. Examples from the IS dimension are:

He needles members for greater effort.
He pushes for increased production.
He asks that group members follow standard rules and regulations, etc.

Examples of those items from the CONS dimension are:

He allows members complete freedom in their work.
He permits the members to use their own judgment in solving problems.
He is reluctant to allow the members any freedom of action (negatively scored), etc.

There were seven consideration items (alpha = .80) and eight initiating structure items (alpha = .92).

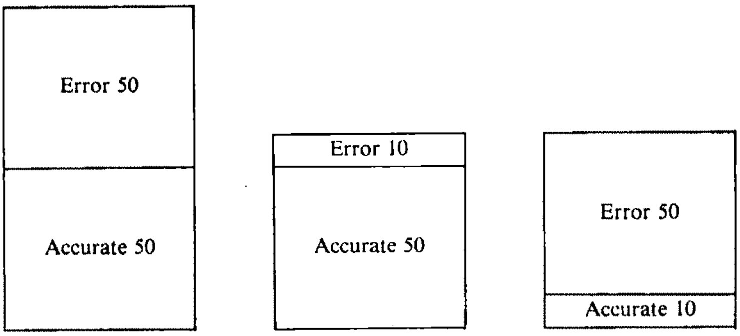
Performance Measures

Performance was scored on the basis of (a) completion, (b) accuracy, and (c) error. The completion measure was simply a tally of all completed numerical responses, with those responses being weighted by the difficulty (number of operations or calculations required) of arriving at the answer. This weighting procedure was based on the number of operations and calculations required to obtain an answer on the work sheet, and it disallowed any advantage to those employees who would skip over the more laborious and time-consuming portions in order to complete the less difficult portions. For example, an answer that was arrived at by converting from inches to feet for two measures (the length and width of a room) and then multiplying length times width was worth one point. However, one that required obtaining the area of a triangle (the roof slopes and ceiling joists on an end wall [see Figure 1]), converting that area to square feet and then converting it again into square meters and adding that area to the other exterior wall area obtained in a similar way was worth three points. The item completion values were estimated by taking the number of calculations (three versus nine).

Completion, however, is a function of two things: the number of computations completed correctly (accuracy) as well as the number completed incorrectly (error), analogous to a quality and quantity distinction. Completion by itself masks certain information that would be available if one were to look at, in addition to completion, both accuracy and error separately. For example (see Figure 4), three employees might score 100, 60, and 60 (completion), with individuals one and two getting different accuracy proportions. Employees two and three have the same completion scores but different accuracy and error proportions. This distinction becomes important when the independent variable contributions to performance are examined, as will be noted later.

FIGURE 4

Partitioning of Performance Completion into Accuracy and Error Components



	Subject 1	Subject 2	Subject 3
Completion	100	60	60
Accuracy	50	50	10
Error	50	10	50
Error Rate	.50	.17	.33

Completion then was determined by simply summing all the completed operations on the work sheets weighted by their difficulty. Accuracy was determined by first examining the distribution of all possible answers for each completed item, and then assigning some *percentage* of the possible points available for that item (its difficulty weight) for each item, depending upon how close the employee's answer was to the true score. For example, a 3-point item may have had a "true" score of 196.5 square meters. For the 35 employees attempting and completing that item, a range of scores was obtained with 181.5 on the low end and 233.8 on the high end. The distribution of employees' scores about the true score was normal, and a percentage of the possible three points was assigned according to the distance of the individual's obtained score from the true score. Those who were within ±.25 standard deviations received 100 percent (three points) for accuracy on that item. Those who were within ±.50 standard deviations received 75 percent of three, or 2.25 points. Those within ±.75 standard deviations received 50 percent, or 1.50 points for that item. Those with standard deviations of greater than ±.75 received 0 points for accuracy on that item. The same standard deviation cutoff points were used for each item. These scores then were summed for a total accuracy score. The remainder of the completion score that had not been accounted for in the accuracy portion for an item was labeled error score. These errors were summed across items for a total error score.

The partitioning of completion into the two components results in two independent components of completion. An independent variable, therefore, could contribute to the variance in goal period accuracy (GPA), goal period error (GPE), or both.

Performance was measured for two phases of the experiment. The first phase was labeled the learning period (LP), and the second phase was termed the goal period (GP). The learning period was designed to allow subjects an adequate amount of time to learn the task. It was anticipated (and confirmed in a pilot test) that the learning curve for the majority of subjects would have peaked in a 2½ hour time period. The goal period began, therefore, after 2½ hours.

Satisfaction Measures

The Job Descriptive Index (Smith, Kendall, & Hulin, 1969) was used as a measure of satisfaction, with only those subscales relating to the job and to the supervisor being utilized. Corrected split-half internal consistency coefficients are reported to exceed .80 for each of the scales.

Perceptual Measures: Environmental Uncertainty

This variable was measured on two dimensions: information and predictability. The first dimension was measured with three items, each on a 9-point scale. The item content was related to organizational goals, the supervisor, and the task. For example, the item related to the supervisor read:

"To what extent is the information provided by your supervisor adequate for the successful accomplishment of your work?"

Not at all:__:__:__:__:__:__:__:__:__:To a very great extent
1 2 3 4 5 6 7 8 9

The task and goal items were similarly constructed. The three predictability questions were asked the same way, and a six-scale composite was formed. The option of using all six items without the information-predictability portion was chosen, inasmuch as the factor analysis of those six items produced only one factor, and the coefficient alpha was .83 for the six-item composite. A sum of the six scores was used to reflect EU.

Perceptual Measures: Behavioral Uncertainty

Expectancy is defined in the literature as a behavior-outcome probability. The higher the probability the more certain an individual is that a particular behavior will result in a particular outcome. In the present study, 11 behaviors and 3 outcomes were used. The behaviors were (1) just getting started, (2) knowing what to do first, (3) getting along with the boss,

(4) getting along with my work group, (5) organizing my work, (6) seeking help, (7) putting in extra time, (8) utilizing outside resources, (9) planning my work, (10) just keeping at it, and (11) working hard. The outcomes were (1) a good performance rating, (2) acceptance by fellow workers, and (3) a sense of accomplishment.

The acceptance by co-workers outcome was included (even though there was little interaction) because of the recent emphasis on social cues as determinants of satisfaction and performance (White, Mitchell, & Bell, 1977; Salancik & Pfeffer, 1978). The subject was asked to indicate the probability for each of the 33 behavior-outcome relationships on a 100-point calibrated scale. A sum of the eleven probability estimates for each outcome was used to reflect the subject's expectancy that outcomes follow behavior.

Data Analysis

The combination of three independent variables resulted in a three-factor design, 2×2×2, with the first factor representing the two task types, the second factor representing the two leadership styles, and the two goal-setting conditions representing the third factor. The data first were examined for homogeneity of variance between tasks, and there was non-significant divergence in these variances. This eliminated the need for any transformation procedures. Analysis of variance was used to test for the effects of the independent variables on the dependent variables (link #1 in Figure 1). Examination of the mediator variables included a two-stage process in which the mediators were treated as dependent variables in the 2×2×2 model just mentioned and then as predictors of performance and satisfaction using correlational procedures.

RESULTS

Manipulation Checks

Leader Behavior—The two leadership dimensions exhibited by the confederates were tested against the perceptions of the subordinates with whom the leaders worked by using the modified version of Stogdill's LBDQ XII (1963), described in the methodology section.

The composite scale for each of these dimensions was used as the dependent variable in a 2×2×2 design with an analysis of variance procedure. Because the leadership dimensions were being treated as independent constructs, two separate analyses were conducted, one for each dimension. A successful manipulation would be evidenced by a main effect for leaders on both of the measured dimensions.

For the IS dimension, there was a main effect for leadership style ($F=53.66$, $p<.001$) but not for goal setting or task structure. The employees in the structured leadership style condition saw their leader as significantly more structuring than did those in the considerate condition ($\bar{X}=31.7$ and 17.7, respectively). For the CONS dimension, there was a main effect for leadership style ($F=32.83, p<.01$) but not for goal setting or task structure. The employees in the structured leadership style condition saw their leader as significantly less considerate than did those in the considerate condition ($\bar{X}=8.8$ and 14.9, respectively). These results suggest that the manipulation of leadership style was effective.

Task Structure—The task structure manipulation was checked against subordinate perceptions by using the scale items discussed in the methodology section. Nine items were used in the composite scale, and the results of the analysis of variance supported the manipulation. There was a significant main effect for the task factor ($F=17.75, p<.001$). The differences in means were in the expected direction and give confirmation to the anticipated effect ($\bar{X}_{amb}=26.8$, $\bar{X}_{str}=36.6$).

There was a significant effect of leadership style on the perceptions of task structure items as well ($F=5.80$, $p<.05$). Although this result is substantially weaker than the task structure manipulation, it does suggest that the structuring leader's behavior had some effect on the perceptions of task structure and that these two variables (leadership style and task structure) may not be entirely independent.

Questions about the specificity of goal setting would make little sense to the no-goals group. Thus no questions were asked about this factor.

Link #1: Performance

The primary focus of analysis will be for the goal period (GP) performance measures, inasmuch as this condition includes all of the independent variables. The learning period did not include the goal-setting manipulation. It should be mentioned, however, that the covariate adjustments for ability (the Wonderlic score) resulted in no main effects for any of the performance measures. No further discussion of the ability measure is needed, therefore, except to point out again that it served its purpose. No one had to be dropped from the study because they could not perform the task, and the variance of the performance scores was relatively homogeneous, as mentioned earlier.

For the total completion measure, there was a significant main effect for task structure ($F=10.96$, $p<.002$) and leadership style ($F=14.44$, $p<.001$). People *completed* more items on the ambiguous task than on the structured task ($\bar{X}_{amb}=26.19$, $\bar{X}_{str}=17.43$), and they completed more items with the IS leader than with the CONS leader ($\bar{X}_{IS}=25.61$, $\bar{X}_{CONS}=18.05$). In addition, the three-way interaction was significant ($F=5.11$, $p<.028$) but uninterpretable.

The source of the performance completion (GP-C) variance can be examined further by looking at performance when it is partitioned into accuracy (GP-A) and errors (GP-E). The analysis of variance indicated that the accuracy portion of completion was the primary source of variance for leader effects ($F = 14.36$, $p < .001$), whereas the error portion of completion was the primary source of variance for task differences ($F = 34.76$, $p < .001$). In other words, the IS leader produced higher *accuracy* than did the CONS leader ($\bar{X}_{IS} = 15.97$, $\bar{X}_{CONS} = 9.65$), but a structured task had fewer *errors* than did the ambiguous task ($\bar{X}_{str} = 3.79$, $\bar{X}_{amb} = 13.94$). These were the only main effects or two-way interactions that were significant.

One surprising result was the lack of a goal-setting effect. One possible explanation for this lack of a main effect was that scores between the goal and no-goal groups might not have been equivalent in the learning period, as is assumed with random assignment. Examination of the column means in Table 1 between these two groups confirms that suspicion. The no-goal group started out with significantly higher performance than did the goal group.

TABLE 1
Column Means of Performance for Goal Conditions[a]

	Learning Period			*Goal Period*		
	Goals Group	*No-Goals Group*		*Goals Group*	*No-Goals Group*	
Completion	9.34	13.19	$t = 2.40^{**}$	20.95	22.90	n.s.
Accuracy	5.19	7.16	$t = 1.58^{*}$	12.92	12.91	n.s.
Error	4.15	6.03	$t = 1.47^{*}$	8.02	9.99	n.s.

[a] The score is performance units per hour within the designated period.
$^{*}p < .05$
$^{**}p < .01$

Because the gains made from the learning period to the goal periods seemed greater for the assigned goal condition than for the no-goal condition, one could examine the significance of that increase by treating the learning period and goal period as repeated measures and doing a repeated measures analysis of covariance. If the goal setting treatment were to produce an effect, one would expect it to show up as a period × goal interaction effect. This $P \times G$ effect was not significant. There was, however, a significant period effect ($F = 72.98$, $p < .001$) suggesting that both the specific and general goal conditions increased significantly rather than the specific goal condition showing a significantly greater increase than the increase obtained in the general goal condition.

An alternative check for a goal effect was to treat the no-goal group and the goal group as separate. A "t" test was made for their performance scores during the LP and GP for each goal condition, anticipating a nonsignificant "t" value for the general goal group and a significant "t" for the specific goal group. In this analysis, all six comparisons (three performance measures for each of the two goal-setting conditions) were significant. That is, both groups showed significant increases. And, although the gains were greater for the specific goal group, they apparently were not significantly greater than those for the general goal conditions, as noted by the lack of effects for the $P \times G$ interaction in the repeated measures analysis.

Link #1: Satisfaction

The JDI measure of satisfaction produced no between-cell differences that were significant, nor was satisfaction related to performance to a significant degree. The development and validation of the JDI has occurred primarily in ongoing work settings and may not have been sensitive enough for the short term job experienced by the employees in this research.

In summary, the results for link #1 show that structuring leaders produce higher accuracy than do considerate leaders, and a structured task results in fewer errors than an ambiguous task. There was no effect for goal setting, and there were no significant relationships between the independent variables and job satisfaction or satisfaction with supervision.

Link #2: Perceptions of Subordinates

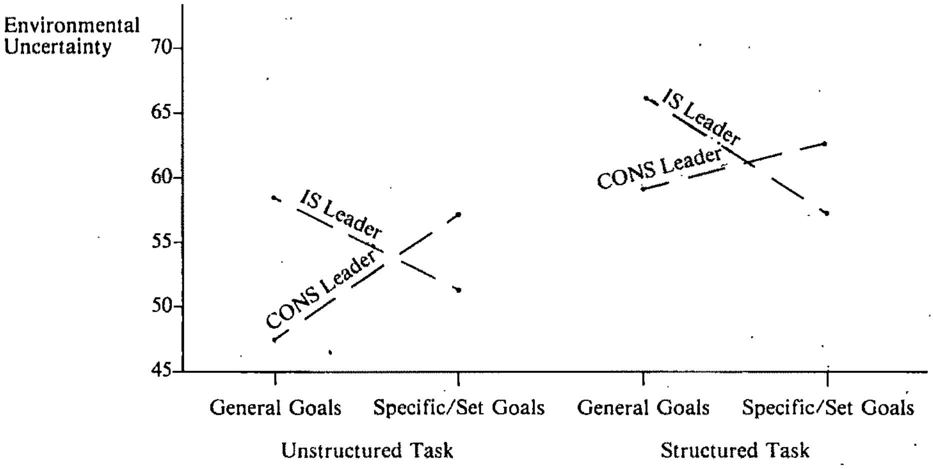
Environmental Uncertainty—Although environmental uncertainty (*EU*) is treated in this study as a potentially important mediator variable, it will be treated here first as a dependent variable in the analysis to clarify understanding of the impact of task structure, leadership style, and goals on *EU*.

With *EU* as a dependent variable in a $2 \times 2 \times 2$ analysis of variance, there was a main effect for task structure ($F = 12.30$, $p \leq .008$) and a two-way leader × goal interaction effect ($F = 8.75$, $p \leq .019$). The main effect demonstrates that structured tasks produce higher certainty than do unstructured tasks ($\overline{X}_{str} = 23.44$, $\overline{X}_{amb} = 19.15$), as one would expect. (A higher score on *EU* means more certainty.) The graph in Figure 5 illustrates the interaction effect.

The interaction pattern in Figure 5 is consistent for both the structured and unstructured task. Regardless of the task, CONS leaders obtain increases in certainty under goal conditions, and IS leaders produce decreases in certainty under goal conditions. The best explanation of this finding is that perhaps too many or too few sources of structure may confuse the subordinate. Thus, structuring leaders with goals and considerate leaders without goals result in high uncertainty, and structuring leaders without goals and considerate leaders with goals result in relatively high certainty.

Behavioral Uncertainty—This construct was measured by summing 11 behavior-outcome expectancy scores for each of three outcomes. A $2 \times 2 \times 2$ analysis of variance was conducted for each of these composites. For outcome *A* (good performance rating), there was a marginally significant effect for leadership style ($F = 3.48$, $p \leq .069$). For outcome *B* (peer acceptance), there was a main effect for leadership style ($F = 9.57$, $p < .01$)

FIGURE 5
Leader by Goal Interaction Effects for Environmental Uncertainty in Each Task Condition[a]



[a]Higher scores mean more certainty (*EU*).

and a two-way $T \times G$ interaction effect ($F=4.82, p \leq .05$). For outcome *C* (sense of accomplishment), there was a near significant effect for task structure ($F=4.96, p \leq .059$), a significant leadership style effect ($F=5.19$, $p \leq .03$), and a two-way ($T \times L$) interaction effect ($F=4.04, p \leq .05$).

All three sets of behavioral uncertainty measures were significantly decreased by a structuring leadership style. The groups led by IS leaders had means of 82.07, 48.26, and 64.71, respectively, for outcomes *A, B,* and *C*, and the CONS leader groups had means of 72.25, 27.80, and 54.76 for the same three outcomes (note again that high scores mean a high probability and, therefore, less uncertainty).

The marginally significant task structure effect for outcome *C* suggested that the structured task produced more certainty than did the ambiguous task ($\bar{X}_{str}=71.55$, $\bar{X}_{amb}=63.74$). The two-way interactions accounted for little variance and require a more lengthy explanation than space permits. A more detailed discussion is available elsewhere (Weed, 1978).

In summary, the results are generally supportive of the hypotheses. Environmental uncertainty was primarily affected by the structure of the task; less uncertainty resulted from a structured task. Behavioral uncertainty, on the other hand, was most affected by the leader's style. The more structuring the leader, the lower the uncertainty. Goal setting had little impact on either uncertainty measure.

Link #3: Uncertainty-Criterion Relationships

The relationships of situational factors to satisfaction and the performance measures (GP-C, GP-A, and GP-E) are reported in Table 2. Some

TABLE 2
Correlation Analysis: Mediator-Criterion Relationships

	Performance			*Satisfaction*	
	Completion (GP-C)	*Accuracy (GP-A)*	*Error (GP-E)*	*Supervisor*	*Task*
Environmental uncertainty	-.01	.27**	-.27**	.23**	.29**
Expectancy *A* (performance rating)	.07	.13	-.02	.17*	.04
Expectancy *B* (peer acceptance)	.10	.12	.04	.06	.15
Expectancy *C* (sense of accomplishment)	-.12	.07	-.23**	.17*	.22**
All 33 expectancies	.09	.27**	-.11	.23**	.19*

*$p<.10$
**$p<.05$

support is found for the hypothesized linkage between the cognitive measures and the performance and satisfaction criteria. In general, the analysis suggests that as *EU* decreases (employees perceive more certainty) accuracy is higher, error is lower, and employees are more satisfied with the task and the supervisor. Increases in expectancy *A* were related to increases in satisfaction with supervision; increases in expectancy *C* were related to reduced errors and satisfaction with the task and supervision. Using all the expectancies as a sum, increased certainty was related to increased accuracy and increased satisfaction with the task and supervision.

These results, although not terribly strong, do support the hypothesis that uncertainty can serve as a potential mediator of the environmental-outcome relationships. In general, a structuring leadership style and a structured task increase behavioral and environmental certainty. This increase in certainty results in higher performance and satisfaction.

Uncertainty as a Mediator

One final question concerns whether uncertainty really does mediate the independent variable–dependent variable relationships described above. It is difficult to present direct evidence on this point due to nature of the design, but some data can be presented that provide partial support for the interpretation suggested. An analysis of Table 2 shows four significant relationships between environmental uncertainty and the criteria (accuracy, error, satisfaction with supervisor and task). The percent of variance accounted for by these relationships is 7, 7, 5, and 8. When a multiple regression equation is generated in which the three independent variables (task structure, goals, and leader behavior) are forced to appear first in the regression, and environmental uncertainty appears last, these figures are 4, 0, 5, and 5. These data suggest that some, but not all, of the variance controlled by the mediator environmental uncertainty is shared in common with the independent variables.

The behavioral uncertainty mediator was significantly correlated with performance accuracy and both satisfaction measures which accounted for 7, 5, and 4 percent of the criterion variance. When entered last in the multiple regression equation these figures are 3, 3, and 2. Both sets of data suggest that the independent variables and the mediators share some variance in common in their relationships with the criteria. See Table 3 for a summary of these regressions.

Another way to do these analyses is to look at the variance accounted for in one of the criteria by one of the independent variables and then see

TABLE 3
Multiple Regressions with the Mediators as the Last Variables Entered in the Regression[a]

	Multiple R	*R Square*	*% Variance*
Dependent Variable = Performance Accuracy			
Variable			
Leader style	.41	.17	.17
Task structure	.41	.17	.00
Goals	.41	.17	.00
Environmental uncertainty	.45	.21	.04
Dependent Variable = Performance Errors			
Variable			
Task structure	.63	.40	.40
Leader style	.65	.42	.02
Goals	.65	.42	.00
Environmental uncertainty	.65	.42	.00
Dependent Variable = Satisfaction with Supervisor			
Variable			
Leader style	.22	.05	.05
Goals	.26	.07	.02
Task structure	.26	.07	.00
Environmental uncertainty	.34	.12	.05
Dependent Variable = Satisfaction with Task			
Variable			
Leader style	.20	.04	.04
Goals	.24	.06	.02
Task structure	.25	.06	.01
Environmental uncertainty	.34	.12	.05
Dependent Variable = Performance Accuracy			
Variable			
Leader style	.40	.16	.16
Task structure	.41	.17	.01
Goals	.41	.17	.00
Behavioral uncertainty	.44	.19	.03
Dependent Variable = Satisfaction with Supervisor			
Variable			
Leader style	.24	.06	.06
Goals	.26	.07	.01
Task structure	.27	.07	.00
Behavioral uncertainty	.31	.10	.03
Dependent Variable = Satisfaction with Task			
Variable			
Leader style	.19	.04	.04
Goals	.25	.06	.02
Task structure	.25	.06	.00
Behavioral uncertainty	.28	.08	.02

[a] The full values are presented because rounding error would cause this percentage of variance controlled to be greater than the *R* square.

how much this figure is reduced by having the mediator variables appear first in the multiple regression. For example, task structure controls 40 percent of the variance in errors. This figure is reduced to 33 percent when environmental uncertainty is introduced first. For accuracy, leadership style controls 17 percent of the variance, and that figure is reduced to 7 percent when either environmental uncertainty or behavioral uncertainty comes first.

Similar results are apparent for the satisfaction measures. Leadership style controls 5 percent of the variance in satisfaction with the superior and 4 percent in satisfaction with the task. This figure drops to 3 percent when either of the uncertainty measures is entered first. A summary of all these data would suggest that both uncertainty measures do share some common variance that is related to the criteria. However, the amount that is shared is not very great, suggesting that the independent variables have their impact on the dependent variables only partially through an uncertainty mediating process.

DISCUSSION

The intent of this study was to examine the differential and causal contribution of situational factors to psychological uncertainty and subordinate performance. Also examined was the impact of the psychological variables on performance. For the most part, the intent of the study was successfully realized. The first goal was to look at the additive or interactive effects of leadership style, task structure, and goal setting on performance. A structuring leader was found to have higher accuracy than was a considerate leader, and a structured task reduced performance errors when compared to a less structured task. There was no effect for goal setting, probably due to the fact that the no-goal group started out with a very high performance, which may have been due to an uncontrolled ability or motivation factor. It also is possible that the manipulation did not work. However, because there was no check on the manipulation (the no-goal group couldn't be asked what their goal was without having some serious demand problems), it is difficult to assess whether this was the problem. Besides, this type of manipulation has worked frequently in the past (Umstot, Bell, & Mitchell, 1976; White et al., 1977).

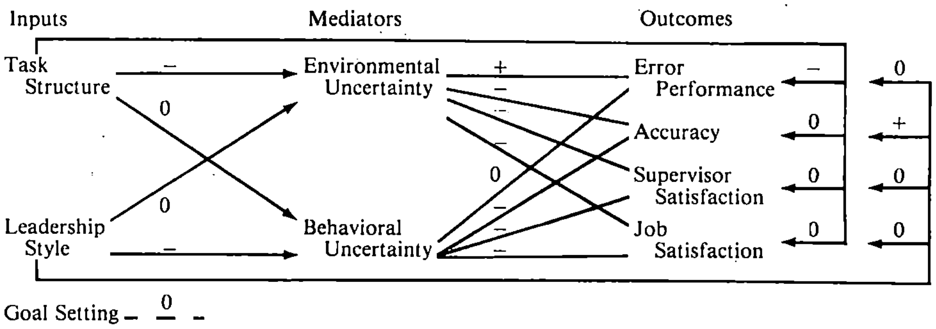
The second goal was to assess the impact of the independent variables on two types of uncertainty. A structured task resulted in less environmental uncertainty than did an unstructured one, and structuring leaders produced less behavioral uncertainty than did considerate leaders. Theoretically, these make sense in that the task structure (an external variable) was related to environmental uncertainty, and the leader behavior (an interpersonal, behavioral variable) was related to behavioral uncertainty, which focused on behavior. Again, there was no effect for goal setting.

A review of these results points out two things. First, an inference about causality is possible, due to the design, and the reported relationships strenthen one's confidence in similar findings in correlational studies. Second, few interactions appeared, suggesting that these different factors make independent contributions to uncertainty and performance. These results may contradict some of the moderator or contingency findings that show that task structure moderates the leader behavior/performance relationship.

The third goal was to see if uncertainty was related to various performance and satisfaction outcomes. Although one cannot infer the causal direction with these relationships as one could with the situation-performance and situation-perception relationships, it nevertheless is instructive to see that the relationships at least exist for this work setting. It allows a fuller understanding of the chain of events, both situational and psychological, that lead to performance differences—an initial aim of the study. Although many subtleties could be drawn from the data, and the interaction effects complicate the interpretation, the primary linkages established by the main effects are diagrammed in Figure 6.

FIGURE 6

A Summary of the Empirical Relationships[a], *



[a] For the Inputs→Mediators relationships a negative sign (–) means increased structure (either task or leader behavior) caused reduced uncertainty. For the Inputs→Outcomes relationships a negative sign means increased structure resulted in less of the outcome (e.g., error). A positive sign indicates that increased structure resulted in more of the outcome (e.g., accuracy). For the Mediators→Outcomes relationships a positive sign means increased uncertainty led to increases in the outcome (e.g., error). Negative signs mean increases in uncertainty led to decreases in the outcome (e.g., accuracy).

*$p < .05$ for correlations

Although this figure oversimplifies the data, it shows the pattern for the main relationships. Overall, the treatments, measurements, and theoretical support generated from the analyses were encouraging. The independent variables of a structured task and a structuring leadership style reduced perceptions of uncertainty. This reduced uncertainty, in turn, was related to higher performance and satisfaction. It probably should be added that although the experimental procedures employed in this study help to clarify some relationships, they do not remove all the ambiguity from the interpretations offered. The independent variables were indeed related to uncertainty, and uncertainty was in turn related to the criteria.

But it cannot be said with absolute assurance that uncertainty was a mediator in this process. A number of things are clear from an examination of the data. First, the variance accounted for by the independent variables on the criteria is greater than is the effect of the uncertainty variables on the criteria. For example, the task and leadership style variables control anywhere from 11 percent to 40 percent of the variance in the performance criteria or satisfaction criteria, and uncertainty controls about 4 percent to 7 percent of this variance. The effects of the independent variables on the criteria cannot be explained by the uncertainty concept only.

It also is apparent that one cannot unambiguously say that the portion of variance on the criteria controlled by uncertainty is in turn controlled by the independent variables. It is possible that other factors besides the independent variables contribute to uncertainty and in turn to productivity and satisfaction. An examination of multiple regression equations with forced solutions using partial correlations suggests that perhaps half of this 4 percent to 7 percent is being controlled in common. Research is needed that manipulates both the situation variables *and* uncertainty to help determine the independent effects of these variables, as well as their common effect on the criteria.

It has been shown that the effects of task structure and leadership style on uncertainty can be separated out. The structure of the task has its major impact on environmental uncertainty, and the structuring of the leader has its major impact on behavioral uncertainty. Second, these independent variables have differential effects on performance. A structured task reduces errors, and a structuring leader increases accuracy. Third, environmental and behavioral uncertainty seem to mediate the independent variable/criterion relationships in the predicted fashion. Higher environmental uncertainty is related to more errors and lower accuracy and satisfaction. Higher behavioral uncertainty results in lower accuracy and satisfaction. Taking into account the qualifications raised in the previous paragraphs, it seems legitimate to argue that uncertainty may indeed mediate the effects of task structure and leadership style on the criteria of satisfaction and performance. But it also is obvious that it is not the only mediator, nor does it consistently explain all the variance in these relationships. These questions are left for further investigation.

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Organization Structure and Technology in Manufacturing: System Versus Work Flow Level Perspectives

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This paper distinguishes between system level and work flow level measures of organizational technology and structure. Data from 20 manufacturing plants support the hypothesis that system level technology (technological change and computerization of support functions) tends to be primarily related to system level structural variables. Work flow level technology (degree of mass production) tends to be related primarily to work flow level structural measures.

Is technology important to the structural design of organizations? Any practitioner, as well as many researchers, would certainly say yes. Yet is is no secret that a considerable controversy surrounds this question in the literature of organization research (Scott, 1975; Donaldson, 1976; Stanfield, 1976; Gillespie & Mileti, 1977; Ford & Slocum, 1977; Fry, 1978).

Most of this controversy has centered around the existence or nonexistence of the "technological imperative" originally proposed by the late Joan Woodward (1965). In her study of some 100 industrial firms in the English midlands, Woodward found that the most successful firms were those that had achieved the best match between their internal structures and their process technologies. However, many subsequent studies have failed to support Woodward's conclusions (Harvey, 1968; Mohr, 1971; Hickson, Pugh, & Pheysey, 1969; Child & Mansfield, 1972; Negandhi & Reimann, 1973). Perhaps the most significant of these was a study of 48 diverse English work organizations by the Aston group (Hickson et al., 1969). These researchers found organization size to be an important mediating variable of the technology-structure relationship. The technological imperative hypothesis was supported only among relatively smaller firms. In large firms, technology was related to only those aspects of structure "centered on the workflow," such as number of workers per foreman, and not to system level aspects of structure, such as centralization. Subsequent replication studies with other samples of work organizations (primarily manufacturers) generally confirmed the Aston group's conclusion that contextual variables, such as size and dependence, were more important predictors of organization structure than was operations technology (Inkson, Pugh, & Hickson, 1970; Child & Mansfield, 1972; Hickson, Hinings, McMillan, & Schwitter, 1974).

All of the above mentioned researchers focused on the technology-structure relationship at the system level of the organization and, therefore, their contradictory results are not very surprising. Both technology and structure are complex and multidimensional variables at this level, as amply demonstrated by the work of the Aston group (Pugh, Hickson, & Turner, 1968; Pugh, Hickson, Hinings, & Turner, 1969). Different researchers have tended to pick different subsets of dimensions to represent each of their variables (as though they were homogeneous categories). Thus considerable variation in results is to be expected (Stanfield, 1976).

Furthermore, the larger and more complex the organization, the more likely it is to operate with several different types of technology. A single aggregate measure such as that used by Woodward is unlikely to capture the aspects of technology most relevant to system level structural variables (Dewar & Hage, 1978). In fact, Woodward (1965) based many of her conclusions on a subset of 80 of her 100 firms because she was unable to classify the rest in any one of her basic categories of unit to small batch, large batch to mass, or continuous process production. In addition, Woodward's sample included a larger proportion of relatively small firms than did those studied by other researchers. About two thirds of her sample had fewer than 500 employees, as compared to only one third for the Aston study (see Donaldson, 1976). Therefore, Woodward's sample firms probably came far closer to being "pure" types with respect to a dominant process technology than did those of other studies.

ENVIRONMENT VERSUS TECHNOLOGY

Finally, it can be argued that Woodward's typology of different process technologies may simply reflect different environmental influences. For example, a particular process technology such as unit manufacturing may tend to develop in response to certain market, technological, or industry characteristics (Donaldson, 1976). If this is the case, Woodward's results may reflect the influence of the external environment on internal structure, rather than the operation of a technological imperative.

Actually those researchers who have defined technology in terms of environmental inputs and outputs have come up with considerably more consistent findings than have researchers, such as Woodward and the Aston group, who focused on the transformation process itself. For example, Burns and Stalker (1961) concluded from their research with 20 English manufacturers that the more rapidly the firms' technological and market environments were changing, the more flexible or "organic" their structures tended to be. Essentially similar conclusions were reached by Lawrence and Lorsch (1969) in their study of 12 large American firms.

Harvey (1968) also defined technology in terms of environmental outputs (i.e., the number of product changes in the previous 10 years). In his study of 43 manufacturers in the United States, he found that the greater the rate of technological (product) change, the less structured or more "organic" his firms tended to be.

The consistency in these results probably reflects the fact that environmental influences are likely to be more relevant to the overall structure of the organizational system that must cope with these influences, than any individual process technology would be.

WORK GROUP VERSUS SYSTEM LEVEL TECHNOLOGY

Another research strategy that has resulted in considerable consistency of results is that of focusing on the relationship between technology and structure at the work group, or subunit, level in organizations. Researchers such as Mohr (1971), Grimes and Klein (1973), Hrebiniak (1974), and Van de Ven (1977) have all reported strong relationships between technology and work group structure. Generally speaking, their findings suggest that as the transformation process (or task) of the group becomes less routine, more uncertain, and/or more complex, its structure becomes more organic, with increased participation, autonomy, and informality for group members.

This remarkable agreement no doubt reflects the fact that all of the above researchers examined aspects of the transformation technology that were clearly relevant to the structure of the activities in the focal organizational units. The same cannot be said for most of the research studies examining structure and transformation process technology at the system level (with the possible exception of Woodward, as pointed out earlier). For example, the Aston researchers (Hickson et al., 1969; Pugh et al., 1969) measured technology at the subunit or work flow level and structure at both work flow and system levels (see Ford & Slocum, 1977). It is not surprising, then, that they found relationships only with structural variables centered on the work flow and not with system level variables. Hickson et al. (1969) also found that their technology measures were much more strongly correlated with system level structural variables among their smaller firms than among larger ones. Similarly, Comstock and Scott (1977) reported stronger relationships for subunits than for the total organization.

It seems clear from these empirical results that any study of the technology–structure connection must differentiate between the systems and work flow levels of the organization. Theoretically, as well as empirically, one can expect to find some very fundamental differences between the functions performed at these different levels of the organization. Based on his interpretation of Parsons's (1960) framework, Thompson, for example, distinguishes between the "technical suborganization" (work flow level) and the "managerial" (systems) level in the following terms:

> In this view, every formal organization contains a suborganization whose "problems" are focused around effective performance of the technical function—the conduct of classes by teachers, the processing of income tax returns and the handling of recalcitrants by the bureau, the processing of material and supervision of these operations in the case of physical production. The primary exigencies to which the technical suborganization is oriented are those imposed by the nature of the technical task, such as the materials which must be processed and the kinds of cooperation of different people required to get the job done effectively.
>
> The second level, the managerial, *services* the technical suborganization by (1) mediating between the technical suborganization and those who use its products—the customers, pupils, and so on—and (2) procuring the resources necessary for carrying out the technical functions. The managerial level *controls*, or administers, the technical suborganization (although Parsons notes that its control is not unilateral) by deciding such matters as the broad technical task which is to be performed, the scale of operations, employment and purchasing policy, and so on (1967, pp. 10-11).

Moreover, Thompson goes on to show how the "managerial," or "boundary spanning" level of the organization functions to buffer the "technical core" level from environmental uncertainty, so it can operate under conditions approaching the certainty of a closed system. It follows, therefore, that the task, or technology, of the boundary spanning, managerial level of the organization typically will be quite different (e.g., more uncertain) from that of the technical core. This, of course, also has been demonstrated by the empirical research of Lawrence and Lorsch (1969), who found, for example, that production department members perceived far more certainty in their environments than did their counterparts in marketing or R&D.

Given this fundamental difference between work flow and systems level functions, it is surprising that researchers typically have not made any effort to distinguish them (e.g., as mentioned earlier, the Aston researchers measured structure at both system and work flow levels, but technology only at the work flow level). However, one recent study apparently examined aspects of both types of technology. Blau, Falbe, McKinley, and Tracy (1976), in their study of 110 New Jersey manufacturing plants, measured the mechanization of the production process in terms of degree of automation as well as Woodward's scale of process continuity. In addition, they assessed the degree of computer usage in the various plants. They found that the activities computerized were typically clerical support functions in areas like purchasing, accounting, production control, and sales, not in the production process itself. Thus the degree of computer use appears to have been a good index of the degree of automation of the various coordinative, service, and control functions that represent the system level of technology. Not surprisingly, the relationships Blau and his co-workers found between structure and the two types of technology were dramatically different. For example, although decentralization of operations decisions was negatively correlated with mechanization of the production process, the relationship was exactly reversed for automation of clerical support functions (i.e., degree of computer use).

THE STUDY

It appears, therefore, that it might be quite instructive to examine the relationship between structure and technology while differentiating between systems and work flow levels of analysis. The research reported here was designed to examine the relationships between organizational structure and (1) system level aspects of technology (i.e., rate of technological change and degree of computerization), and (2) work flow level technology (degree of mass production). In keeping with previous research, the influence of other key contextual variables, such as organization size and dependence, was also investigated.

Hypotheses

Based on the above analysis of prior research results, the following basic working hypotheses were established:

1. *System level measures of organization structure will be directly related only to technology variables with a system-level impact (such as the rate of technological change and degree of computer use) as well as to contextual variables like organization size and dependence.*
2. *Work flow level measures of organization structure will be directly related only to technology variables with a work flow level impact, such as the degree of automation or mass production technology.*

The above two working hypotheses were tested with data collected from a sample of 20 Ohio manufacturing establishments ranging in size from 270 to 4,000 employees and producing a variety of products such as chemicals, food, clothing, machine tools, and mechanical rubber products. Information was collected with semistructured interviews with executives at the top two to three levels in each firm and from examination of available documents such as policy manuals and organization charts. Between three and seven executives were interviewed at each research site.

Technology Measures

Three different aspects of organizational technology were examined in this study. The first was a work flow level aspect of the transformation technology based on Woodward's (1965) scale of production continuity. Because many firms in this study actually used a mix of the different categories, a weighted average of the relative importance of each category was computed to arrive at an index of the "degree of use of mass production techniques" (see Reimann, 1977).

The second measure was a system level aspect of the transformation technology—the extent of computer use in clerical functions, such as payroll, inventory control, and production scheduling. A number of those organizations using computers did not have their own facilities on the premises. Typically these were subsidiaries or branch plants that used data processing facilities located at corporate headquarters. To assess this important aspect of computer use, a dummy variable was created, indicating whether a given organization did or did not have its own data processing facilities. (These measures were similar to the ones used by Blau et al., 1976.)

The third measure of technology concerned another aspect of the system level operation of the organization—the rate of change in the technological environment. That is, this measure focused on characteristics of environmental inputs and outputs, following the example of system level researchers such as Burns and Stalker (1961), Harvey (1968), and Lawrence and Lorsch (1969). The rate of technological change was operationalized as the change in productivity in the organization's primary industries. (Productivity change has been shown to be a valid indicator of technological change in general by Mansfield, 1971.) Rates of productivity change (1959-1969) obtained from a Bureau of National Affairs (1973) publication for the 4-digit SIC codes representing each firm's major outputs were averaged to give a score for technological change. (This score varied from .3 percent for a manufacturer of nuts and bolts to 6.0 percent for a producer of petroleum additives.)

Organization Structure

The main dependent variable in this study was organization structure. Three major dimensions of system level structure have been identified in prior research (Pugh et al., 1968; Reimann, 1973): (1) Differentiation or specialization (horizontal and vertical), (2) formalization, and (3) decentralization.

The degree of horizontal differentiation or functional specialization was assessed by counting the number of staff specialties (from a specific list of 17 staff functions) that were performed by at least one full time specialist. (See Reimann, 1973 or 1979 for a complete listing of the 17 staff functions.) The degree of vertical differentiation, or vertical span, was simply the number of levels in the hierarchy from chief executive to bottom level employees. The degree of formalization also was based on the Aston scale and was measured by the degree to which the employees' roles were formally defined by official documents such as job descriptions, standard operating procedures manuals, and the like (Inkson et al., 1970).

Two aspects of decentralization were investigated. Blau and his coworkers (1976) found that decentralization of authority for personnel decisions differed considerably from that for operational (marketing and production) decisions. Therefore, for the present study separate decentralization indices were constructed for (1) personnel and (2) operations.

Twelve personnel-related and 11 operations-related decisions were chosen from a list of typical management decisions developed by the Aston researchers (see Reimann, 1973). For each of these decisions the level at which authority to make the decision resided was established by questioning executives at the top two levels of the organization. If the decision had to be referred to a higher authority by the chief executive officer (CEO) (i.e., to the board of directors, or corporate headquarters), it was scored as a zero. If the CEO made the decision himself, it received one point, and if he delegated it to the second level it scored two points. When second level executives also delegated the decision, it received three points. (This was the maximum for any one decision.) The final scores for the indices of personnel and operational decentralization then were simply the total points for the twelve and eleven decisions, respectively.

In addition to the above five system level structural variables, a number of researchers have found various administrative or staff ratios (e.g., "administrative intensity") to be important aspects of organization structure (Pondy, 1969; Freeman, 1973). A study by Child (1973) has shown that aggregate variables such as administrative intensity can be quite misleading, because these variables actually may not be homogeneous at all. A cluster analysis of the sizes of the 17 staff functions revealed that only about half of these functions clustered together. Three other, relatively independent clusters also were identified (Reimann, 1979). Therefore, these four relatively homogeneous categories were used in the present study instead of a single aggregate measure. The four categories were as follows: (1) The general staff size included the number of employees in 10 of the 17 functions and therefore came closest to the aggregate measure of the size of a general supportive component or administrative staff used in previous research. (2) The maintenance staff size included the number engaged in maintenance of plant and equipment as well as employee health and welfare. (3) The development staff size indicated the number working on the development of material resources (e.g., research and development), as well as human resources (e.g., employee training and development). (4) The planning and control staff size included the number employed in quality control, production planning and control, and market or strategic planning functions.

Finally, a number of researchers such as Woodward have looked at various managerial spans as indicators of structure. The spans of control at the top (CEO) and bottom (first line supervisors) levels were therefore also assessed in this study.

Most of the above measures relate primarily to the structure of the total organizational system. However, a few indicators could be considered as being more closely related to the work flow or core technology itself. The maintenance staff is primarily concerned with the work flow, as is the span of first line supervisors. The operating decisions component of decentralization focuses primarily on decisions related to the transformation process or "core" operations; the personnel component is more concerned with general supportive or staff functions (see Reimann, 1973). The above three aspects of structure therefore may be considered relatively more concerned with the work flow. The rest were relatively more concerned with system level activities.

Contextual Variables

Previous researchers have found a number of contextual variables other than technology to be related to organization structure. By far the most important of these variables seem to be the organization's size and its dependence on other organizations (Pugh et al., 1969; Inkson et al., 1970). These variables also were included in this study.

Organization size was the number of full time employees in the organization at the time of this study. (Total number of employees was highly correlated with sales volume, another common indicator of size of manufacturing organizations [$r = .90$]. Because the distribution was highly skewed, the natural logarithm was used in all statistical analyses. The same transformation was used for all staff size measures.) Dependence on other, higher authority organizations was measured by means of the Inkson et al. (1970) dependence scales. These took into consideration the impersonality of origin (i.e., was the firm founded by a person or a corporation), its status (branch plant, headquarters, etc.), the public accountability of the ultimate owners (i.e., government or shareholder), and the size of the organizational unit relative to the total or parent organization. Seven of the organizations were independent corporations; three of these were owner-managed. Another seven were subsidiaries with legal identities, and the rest were branch plants. Therefore, there was considerable variation with respect to dependence on other (parent) organizations. The measure used for scoring of dependence followed that of Inkson et al. (1970).

RESULTS

The results of bivariate correlations, presented in Table 1, gave considerable support to the hypotheses of this study. The variable most strongly and pervasively related to system level structural variables was the system level technology measure of the presence of a computer at the site of the study. The actual degree of use of the computer (i.e., number of functions computerized) and technological change were not significantly related to as many structural variables but tended on the whole to be more strongly related to system level than to work flow level variables. (Many of the variable measures were rank ordered at best with distributions often departing considerably from normality, so that parametric statistical methods might not seem entirely appropriate. However, a comparison of Spearman's rank order correlations and their product-moment counterparts revealed few serious differences. Therefore the more powerful parametric tests were used. Moreover, since the sample of firms was not random [due to a poor response rate], statistical hypothesis testing techniques and "significance levels" were used only to determine whether the relationships observed were more than mere chance associations and therefore worth reporting, rather than to generalize to some population of organizations.)

TABLE 1
Correlations Between Selected Structural and Contextual Variables (Decimals Omitted)

	Contextual Variables					
Structure	*Mass Production*	*Technological Change*	*Computer Use*	*In-House Computer*	*Organization Size*	*Dependence*
1. *Specialization*[a]	-04	11	47*	54*	69**	-12
2. *Vertical Span*[a]	18	23	31	61**	54*	-26
3. *Formalization*[a]	47*	00	32	-19	05	67**
4. *Decentralization*						
(a) Personnel[a]	-30	25	-05	49*	09	-56*
(b) Operations	-63*	35	00	49*	13	-58*
5. *Staff Personnel*						
(a) General[a]	06	28	55*	59**	83**	-20
(b) Maintenance[b]	46*	02	33	03	32	23
(c) Development[a]	-05	38	39	45*	54*	-16
(d) Planning and Control[a]	04	36	49*	54*	74**	-06
6. *Spans of Control*						
(a) CEO[a]	-06	-26	07	01	03	08
(b) First line supervisor[b]	-15	-03	20	27	29	03

[a] System-level structure
[b] Work flow-level structure
*$p<.05$ (two-tail)
**$p<.01$ (two-tail)

However, as found in many previous studies, other contextual variables (i.e., organization size or dependence) also were significantly related to most aspects of structure. Therefore, a reliable test of the hypotheses proposed in this study could be accomplished only with a multivariate analysis to control (at least statistically) the effects of these other contextual variables.

Table 2 shows the results of stepwise multiple regression of each structural measure on the set of contextual variables examined in this study. Only models significant at the .05 level are shown. The degree of horizontal differentiation, or specialization, was related primarily to organization size and (less strongly, and not significantly) to the presence of an in-house computer. This finding is essentially in keeping with most prior research such as that by Pugh et al. (1969) and Blau et al. (1976). Vertical differentiation, or span, was not found to be related to organization size, contrary to expectations from prior research. Rather, the most important predictor was the presence of an in-house computer, with mass production a distant (and nonsignificant) second. This finding also replicates that of Blau et al. (1976).

Formalization was related most strongly to dependence and to a lesser (and nonsignificant) extent to the degree of mass production and the presence of an in-house computer. This finding probably reflects the fact that relatively dependent firms (i.e., subsidiaries or branch plants) tended to be more highly formalized than did their independent counterparts. This was to be expected because the local plant's degree of formalization

TABLE 2
Stepwise Linear Regression Models[a]

	Beta	*F*
1. *Specialization*		
Predictors:		
Organization size	.573	7.801**
In-house computer	.2114	1.088
Adjusted $R^2 = .485$		8.958**
2. *Vertical Span*		
Predictors:		
In-house computer	.670	13.591**
Mass production	.316	3.016
Adjusted $R^2 = .430$		7.294**
3. *Formalization*		
Predictors:		
Dependence	.712	10.524**
Mass production	.232	1.551
In-house computer	.250	1.499
Adjusted $R^2 = .486$		6.258**
4.A *Decentralization* (Personnel Decisions)		
Predictors:		
Dependence	−.421	3.284
In-house computer	.258	1.236
Adjusted $R^2 = .325$		4.875*
4.B *Decentralization* (Operations Decisions)		
Predictors:		
Mass production	−.612	15.526**
Technological change	.353	5.053*
In-house computer	.273	2.933
Adjusted $R^2 = .601$		9.584**
5.A *General Staff*		
Predictors:		
Organization size	.729	21.576**
In-house computer	.182	1.339
Adjusted $R^2 = .693$		21.316**
5.B *Development Staff*		
Predictors:		
Organization size	.469	5.321*
Technological change	.255	1.567
Adjusted $R^2 = .260$		4.581*
5.C *Planning and Control Staff*		
Predictors:		
Organization size	.557	8.301*
In-house computer	.355	2.545
Dependence	.307	2.560
Technological change	.170	1.044
Adjusted $R^2 = .549$		6.664**
5.D *Maintenance Staff*		
Predictors:		
Mass production	.457	4.744*
Adjusted $R^2 = .21$		4.744*

[a] Only models significant at .05 level, and with $F \geq 1.0$ for each individual predictor, are included.
*Significant at $p < .05$
**Significant at $p < .01$

was likely to have been strongly influenced by the much larger parent organization. Therefore, the dependent plants tended to be more formalized than the independent ones of equivalent size.

Decentralization of personnel decisions was a function of decreasing dependence and the local presence of a computer, with neither of these predictors reaching the .05 level of significance. This finding reflects the fact that a number of the more dependent subsidiaries were constrained in personnel related decisions by a corporate, computerized "human resource inventory" system. Apparently the presence of an in-house computer tended to counteract this somewhat.

Decentralization of operating decisions was related to all three aspects of transformation technology examined in this study. These variables accounted for over 60 percent of the variance in this structural variable. The findings suggest that operations decisions tended to be decentralized for relatively lower degrees of mass production, greater rates of technological change, and when an in-house computer was available. These results were in keeping with Blau et al.'s (1976) conclusion that operating decisions tend to be kept relatively more centralized for the more capital intensive factories at the high end of Woodward's scale of mass production, but personnel decisions seem to be quite independent of this aspect of process technology.

The positive relationship with the rate of technological change was, of course, in line with the findings of the contingency theorists such as Lawrence and Lorsch (1969) and Burns and Stalker (1961). Finally, the relationship with the presence of an in-house computer, although not significant, also corroborated Blau et al.'s conclusion that "an in-house computer to automate support functions promotes decentralization" (1976, p. 35). As in the present study, Blau et al. found this relationship to hold for operations but not for personnel decisions.

The size of the general staff was related primarily to organization size and far less strongly (and insignificantly) to the presence of an in-house computer. Together these two independent variables accounted for about 69 percent of the variance in the size of general staff. These results were not surprising. Increasing organization size clearly would lead to absolute increases in general staff, and the presence of a computer just as obviously would increase staff in the electronic data processing (EDP) function.

By the same token, both development and planning and control staff sizes (as expected) also were primarily related to organization size. However, the secondary predictor variables were quite different for these two types of staff. Development staff also was modestly and positively related to the rate of technological change. This seems reasonable. Increasing rates of technological change would require increases in the development of both material and human resources.

In addition to size, the planning and control staff was positively related to the presence of an in-house computer, dependence, and the rate of technological change. Possibly the availability of a computer may have encouraged the building of staff in planning and control (or vice versa). Also, a dependent branch plant or subsidiary tended to have a larger planning staff, perhaps (as for formalization) reflecting the structural characteristics of the parent corporation. The very modest positive relationship with technological change also seems reasonable. The greater the change and uncertainty of the technological environment, the more monitoring and strategic planning emphasis would be expected.

The size of maintenance staff, surprisingly, was totally unrelated to organization size. Rather, the only significant predictor of the number of people employed in maintenance activities was the degree of mass production. This undoubtedly reflected the increasing need for staff to maintain equipment and monitor the safety and welfare of employees as factories become more mechanized.

As can be deduced from the correlations shown in Table 1, neither of the span of control variables was significantly related to any combination of contextual variables, so these structural variables are not shown in Table 2. These low correlations of course might have been due to curvilinear relationships such as some of the ones reported by Woodward (1965) as well as by Blau et al. (1976). However, scatterplots were made of all bivariate combinations of dependent and independent variables in this study, and no curvilinear patterns were observed. Furthermore, the correlation ratios (etas) were also computed, and none were sufficiently larger than their Pearson product moment equivalents to indicate any likely nonlinear associations.

The results of the multiple regression analyses are summarized in Table 3. For each dependent structural variable the beta coefficients are shown for all independent or predictor variables in the regression models of Table 2. This summary (Table 3) demonstrates the pervasive effect of organization size reported in previous research (Hickson et al., 1969; Child & Mansfield, 1972; Blau & Schoenherr, 1971; Blau et al., 1976). Dependence also was found to be related to three aspects of structure (with only one reaching significance), at least partially replicating the Aston results (Pugh et al., 1969; Inkson et al., 1970).

TABLE 3
Summary of Stepwise Regression (from Table 2)

		Beta Coefficients for Contextual Variables				
		A. Work Flow	*B. System Level*			
Structure	*R-Square of Model*	*Mass Production*	*Technological Change*	*In-house Computer*	*Organization Size*	*Dependence*
A. *System Level*						
Specialization	.49**	—	—	.21	.57**	—
Vertical span	.43**	.32	—	.67**	—	—
Formalization	.49**	.23	—	.25	—	.71**
Decentralization-personnel	.33*	—	—	.26	—	-.42
General staff	.69**	—	—	.18	.73**	—
Development staff	.26*	—	.26	—	.47*	—
Planning staff	.55**	—	.17	.36	.56*	.31
B. *Work Flow Level*						
Decentralization-operations	.60**	-.61**	.35*	.27	—	—
Maintenance staff	.21*	.46	—	—	—	—

*$p<.05$
**$p<.01$

The summary in Table 3 also gives considerable support to the working hypotheses of this study. The first hypothesis predicts that system level measures of organization structure would be (significantly) related only to system level contextual variables. This prediction was clearly borne out by the regression analyses. As may be seen in Table 3, the system level structural variables were significantly related only to technological change, in-house computers, size, and dependence—all system level contextual variables.

The second hypothesis predicts that work flow level structural variables would be (significantly) related only to work flow-level contextual variables. This hypothesis also was supported. The two work flow level structural measures of decentralization of operations decisions and size of maintenance staff were significantly related to mass production technology—clearly a work flow level measure. A similar, strong relationship between maintenance staffing and Woodward's technology measure also was reported by Blau et al. (1976).

In this study the decentralization of operations decisions also was significantly (though just barely so) related to the rate of technological change. This was the only instance in which a systems level contextual variable (technological change) apparently had a (significant) influence on a work flow level structural variable. However, this was in line with the predictions of the contingency theorists (such as Burns & Stalker, 1961, or Lawrence & Lorsch, 1969), that increasing changeability or uncertainty in the technological or market environment would lead to increasing decentralization of decision making in general. Moreover, as pointed out previously, a few of the operating decisions certainly have some system level implications (e.g., type of product produced, type and extent of market served) and are likely to be affected by environmental (technological) change.

In any event, the results of the above regression analyses clearly support the proposition that system level structural variables will be essentially a function of system level contextual variables (i.e., system level technology variables as well as size and dependence) and work flow level structural variables will be related primarily to work flow level contextual variables (i.e., the core technology).

SUMMARY AND IMPLICATIONS

As have a number of its predecessors, this study has demonstrated that the relationships between organization structure and technology are complex and selective. It has gone beyond most previous research in making an explicit distinction between system level and work flow level measures of both structure and technology. In so doing, this research also has suggested that the technology-structure connection may be very much a function of the level of analysis. When both sets of variables were measured at the same level (work flow or system), some strong relationships were typically found in this and most prior research. However a mix of levels (system vs. work flow and vice versa) typically resulted in little or no relationship between technology and structure.

Unfortunately, at the present time there is no fundamental, generally accepted theory to explain observed relationships between technology and structure. A major reason for this, of course, is that there are no agreed upon definitions of either concept (see Stanfield, 1976). Also, as pointed out previously, there is little agreement on the appropriate level of analysis. However, the most important underlying problem may be that research simply has not progressed far enough to permit the development of a general theory. Nevertheless, a less ambitious "mid-range" theory may be offered about the relationship between certain (measurable) aspects of technology and structure at specific levels of analysis in particular types of organizations.

The research reported in this paper can provide the basis for a limited theory of the technology-structure connection in manufacturing organizations, as long as the variables are defined in the way they have been operationalized in this study. That is, technology was defined as the degree of continuity and automation of the organization's transformation processes. This degree of automation was considered at the work flow level (degree of mass production), and at the systems level (degree of computer use). Also, the environmental rate of change in the degree of automation (technological change) was considered. Organization structure was defined in terms of degrees of specialization, formalization, decentralization, and the sizes of various personnel ratios.

The key question then is: How does the degree of automation influence the various aspects of organization structure? A likely connection may be through the impact of automation on the control and coordination of individual task and activities. For example, Ouchi (1977) proposed that technology may affect structure through the organizational control system, which he defined as the process whereby the organization evaluates and monitors the behaviors or outputs of its members. Similarly, Reeves and Woodward (1970) have indicated that the major function of structure is the control of the behavior of the organization's members. They also have suggested that a given process technology influences structure through the requirements it imposes on the organization's control system—particularly the degree of personal versus mechanical control.

Thompson (1967) argued that the basic purpose of organization structure is to achieve "bounded rationality" for its members—that is, to reduce the degree of uncertainty of their tasks. To this end, organization structure must "facilitate the coordinated action of...independent elements" (1967, p. 54). Many other researchers, including Perrow (1970), Hrebiniak (1974), and Van de Ven (1977), have suggested that the connection between technology and structure is the degree to which the task requirements of an organizational unit are predictable and programmable.

Again the connection is through the coordination or information processing requirements imposed by different degrees of task uncertainty (Galbraith, 1977).

A more abstract and fundamental theoretical argument of relevance to the technology-control-structure connection is provided by Ashby's (1956) "Law of Requisite Variety." In order for a transformation process to be able to control a given amount of variety or complexity of inputs, its internal structure must have at least an equivalent amount of variety or complexity. Therefore, the technological complexity and variability of the transformation process puts some definite limits on the available range of structural designs that can effectively control organizational activities. The upshot of these theoretical arguments is essentially that technology (i.e., degrees of automation) imposes certain constraints on the range of organization structures that can effectively manage or control information flows and uncertainty.

The findings of this and previous research appear to be quite consistent with this theory. At the work flow level the degree of decentralization of operating decisions in this and Blau et al.'s (1976) studies was strongly and negatively correlated with the degree of mass production (see Table 3). The increased mechanization of the work flow would increase the need for centralized coordination and control of the various interdependent work flow activities. The weaker positive relationship between technological change and decentralization of operating decisions also was consistent with the theory. Technological change would tend to increase unpredictability and "variety" of input. This, in turn would require an increase in complexity (i.e., decentralization) of the organization structure to cope with this increased input variety and maintain control of the work flow. A number of previous studies, such as those of Burns and Stalker (1961) and Lawrence and Lorsch (1969), have found similar correlations between technological (and market) conditions and organization structure.

At the systems level, the automation (computerization) of support or managerial functions was strongly related to the number of levels in the hierarchy. This finding is similar to that of Blau et al., who interpreted it as follows: "A computer system serves as an impersonal mechanism of control, which makes it less disadvantageous for top management to be separated from the workflow by many hierarchical levels" (1976, p. 32). Therefore, this result also fits the theoretical explanation that technology affects structure through its influence on the way organizational activities need to be controlled.

None of the other system level structural variables were significantly related to technology in this study. However, the other contextual variables of size and dependence were significantly related to a number of aspects of structure. Organization size was positively related to the degree of specialization and several of the staff ratios, as would be expected from prior research (Hickson et al., 1969; Blau & Schoenherr, 1971). Again, it can be argued that increasing size makes specialization and use of staff more economical as well as necessary for control or coordination of the organization's increasing variety of activities (Blau & Schoenherr, 1971; Galbraith, 1977).

Similarly, the strong relation of formalization to dependence reflects the tendency of parent organizations to use formal policies and procedures (e.g., standard operating procedures manuals) to help control the activities of their subsidiaries.

The results of this study have added some additional evidence to that of a number of earlier studies in support of a theory that connects organization structure to technology via the organization's need to control the activities of its members and subunits. In addition, the research results have reinforced the theoretical notion that technology will influence structure primarily at that organizational level at which it has the most direct impact in its requirements for coordination and control. Unless future researchers pay closer attention to this theoretical, multilevel connection between technology and organization structure they are doomed to carry on the empirical controversy over the "technological imperative" indefinitely.

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Employee Ownership: Implications for the Organizational Distribution of Power[1]

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Workers' and managers' perception of their roles as employee owners, financial partners, and joint decision makers were examined in a furniture factory purchased by its employees through a corporate divestiture. Worker owners in general considered management as the true owners of the firm, did not see themselves as partners, and preferred an internal distribution of power that favored management over power equalization.

The distribution of power and control among members of work organizations is a continuing interest of theorists and researchers in organizational behavior. The diffusion of ownership among stockholders has presumably given control of some large corporations to groups of managers and technical experts who act on behalf of owners (Berle & Means, 1932; Dahl, 1970; Dahrendorf, 1959; Drucker, 1971). However, control is not always contingent upon either ownership or managerial status. Limited control over specific issues often rests with nonowning workers through participative management and collective bargaining (Strauss, 1977). This study examines the ownership-control relationship when workers without previous ownership rights obtain substantial amounts of stock in the company in which they work.

Several cases of the redistribution of ownership have come about when employees facing unemployment due to impending plant closures have managed to purchase the threatened plants (Stern & Hammer, 1978).

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(Employees also have become owners of considerable stock in corporations through the increasingly popular Employee Stock Ownership Plans [ESOPs]. In several Western European countries, such forms of employee ownership are enforced by legislation.) The purchase effort produces a situation in which workers, managers, and members of the surrounding community become plant owners. Because ownership (usually in the form of stockholding) resides in both management and workers, these firms provide a unique opportunity to investigate whether ownership implies control or a desire for changes in the distribution of control. This paper will consider how people perceive themselves as stockowners, how they define their rights to control over company decision making processes, and how they see their own roles in the organization.

Employee owned companies in the form of producers' cooperatives in which employees commonly own and manage the business, occurred as early as 1791 in the United States and increased dramatically in the late nineteenth century (Shirom, 1972; Jones, 1977). Firms organized along traditional lines also have made small amounts of company stock available to selected employees through fringe benefit stock options and bonus plans since the 1920s (Foerster & Dietel, 1926).

Both cooperatives and traditional capitalist firms are based on the philosophy that ownership means governance. But in the cooperative, ownership shares are distributed equally, giving each member one vote in the decision making process (Berman, 1967). In the traditional firm, management is delegated decision rights by owners. However, under a variety of labels from "participative management" and "co-determination" to "workplace democratization," a limited amount of sharing in decision processes has been granted to employee nonowners (Bernstein, 1976; Dachler & Wilpert, 1978; Locke & Schweiger, 1978). The current employee owned firms fall somewhere in between because shares are distributed according to the amount individuals invest or their relative wages (under ESOPs), producing an unequal distribution of shares. Few formal procedures have been made for power sharing between managers and the new worker owners. Participation in decisions is based on voting shares as a corporate stockholder.

Employee stock ownership is believed to create a positive working relationship between employees and employer by creating perceptions of common interests and commitment to shared goals or organizational success (Lawler, 1977). Under employee ownership some form of psychological partnership may develop between groups of owners that leads individuals to act in behalf of common goals.

The ability of joint economic fate alone to create this partnership remains an open question (Bernstein, 1976; Johnson & Whyte, 1977; Vanek, 1975). Stockownership does not necessarily bring sharing of control but may raise expectations of future input into decisions, and the failure to obtain increased influence may reduce such hypothesized benefits of common ownership as increased worker motivation and performance.

These arguments emphasize the critical nature of the owners' interpretation and perception of their ownership rights. When actual sharing of control is desired, changes in decision making processes are needed to avoid frustrated expectations on the part of new worker owners. However, Pateman (1970) and Dahl (1956) have suggested that workers do not necessarily want industrial democratization. They may prefer to leave control in the hands of expert managers (Locke & Schweiger, 1978; Strauss, 1963) at least until they feel confidence in their ability to make policy level decisions. Ownership without a desire for control is unlikely to produce changes in the decision making process. Though a desire for power sharing on the part of worker owners may not be sufficient for bringing about change, it is probably necessary in order to begin the process.

HYPOTHESES

Stockholding and Perceptions of Ownership

An announced plant closing precipitates a crisis in which workers seek a means of avoiding job loss. An employee purchase results in the maintenance of an existing organization rather than the creation of a new one. Initially, the only tangible change may be the redistribution of ownership rights.

Because many individuals have acted to save jobs rather than investing for the sole purpose of financial returns, the investment may not be translated into perceptions of ownership. Nevertheless, a risk has been taken, equity is held, and energy was invested in the purchase effort. Kohn and Schooler (1973) found that people who have a substantial share of ownership of the organization in which they are employed respond to their job situations differently than do those who own less. They argue that those with ownership rights not only control assets but also consider themselves owners. It is therefore hypothesized that *the larger the number of shares an employee owns in the organization the more he perceives himself as an owner of the firm (Hypothesis 1a).* ("Employee" includes anyone who works for the company on a regular basis for wages or salary regardless of hierarchical position.)

The financial partnership between management and workers in an employee owned firm is necessitated by mutual fate control (Thibault & Kelley, 1959) over the success of the purchase attempt. Because of the joint effort involved, nonmanagerial workers may interpret their ownership as part of a real partnership with management in the firm. At the same time, the number of shares each individual has purchased varies, and some have not bought stock at all (Gurdon, 1978; Long, 1977). Those with little or no stock have not taken the full risk which binds the partners together (Burnstein, 1969; Cartwright, 1973) and may not feel the same degree of partnership. These differential commitments suggest a subsidiary hypothesis that *the more capital a worker has invested (the more a* *person has risked), the more he should perceive himself as a partner with management in the enterprise (Hypothesis 1b).*

Stockownership and Desired Control over the Decision Process

When employees become owners through the purchase of stock, they gain the formal power to cast votes and effect major policy decisions brought before the annual stockholders meeting, but the legal right to vote stock in no way guarantees that employee owners will have much actual influence on the outcomes of other decision processes. However, participation in decisions by worker owners may come about independent of legal voting rights if the rank and file workers are motivated to take an active part in decision making processes and if the firm's management is willing to share control with other members of the work force.

Despite the assertion that workers are reluctant to take on decision making responsibilities, employee ownership increases workers' stakes in the firm and with it their presumed interest in protecting property and investment in the future. Nonmanagerial worker owners may want influence over factors that directly affect the economic condition of the organization, decisions that traditionally are made by owners and managers (Dachler & Wilpert, 1978). These decisions include policies such as investments, product development, marketing, and distribution of profits, along with choosing corporate officers and chief executives. The desire for influence in these decisions that affect future prosperity should be stronger for workers with a greater financial commitment to the firm. *The more capital an employee has invested in the firm, the more control the individual will want to exercise over decisions that concern the future welfare of the organization (Hypothesis 2).*

In other cases of employee ownership (Stern & Hammer, 1978), the nature of the jobs themselves and the short term returns from the job have not changed noticeably. Work methods and work organization, which normally are under control of management, have remained management decisions, and little evidence addresses the possibility that worker owners desire control over these issues that were previously management's prerogatives. In unionized plants, however, workers have had considerable influence over such issues as the distribution of wages, fringe benefits, and pension plans through the collective bargaining process. Workers may be expected to want to maintain their present control in these areas.

These arguments lead to the suggestion that the new ownership status of the nonmanagerial employees will affect their desire for changes in the control structure differentially as a function of the particular issues involved. Thus, it is hypothesized that *nonmanagerial employee owners will prefer a distribution of influence that gives them more influence over decisions that affect the future of the company than they had experienced as nonowners, but that maintains the power they previously had over other* *issues (Hypothesis 3).* A similar hypothesis could be made for managers by reversing the issue areas. Managers would prefer to reduce the constraints that were previously imposed by union influence in areas covered by collective bargaining without losing the influence they held over policy issues.

Occupational Interest Groups

Occupational positions such as labor and management or blue-collar, white-collar, and managerial provide specifications of interest groups that exist within a firm. These groups have different definitions of the appropriate distribution of control in the organization (Tannenbaum, Kavčič, Rosner, Vianello, & Wieser, 1974). Unless ownership interests are strong enough to overcome occupational interests of historical standing, employees in worker owned firms will prefer a distribution of control over decisions that corresponds to interest group membership.

In a unionized setting the local union and collective bargaining are the traditional basis of interest group influence for the unionized sector. The reliance on the union is particularly strong for blue-collar workers who may initially lack the expertise to make decisions beyond the confines of their jobs (Mulder & Wilke, 1970). Unionized, white-collar workers may not be quite as dependent on the union for representation. Compared to their blue-collar co-workers, they generally are better educated, have more information about company operations, and have a different perspective on the decision making process (Blum, 1971). These interest group differences suggest that *members of the nonmanagerial unionized white-collar workforce in employee owned firms will prefer a distribution of control in decision making in which employees participate as a group to a system of control based on collective bargaining, but unionized blue-collar workers will prefer union control over employee participation outside of collective bargaining (Hypothesis 4).*

In American joint labor-management collaboration, managers have shown a preference for cooperation with employee groups and representatives outside of the union (Davis & Cherns, 1975; Katzell, Yankelovich, & Associates, 1975). Kochan, Lipsky, and Dyer (1975) suggest that joint labor-management cooperation is likely only on issues that lie outside of collective bargaining. Managerial preferences suggest that *if the management in employee owned firms is willing to share control, it will want more control in the firm's decision making process given to the employees as a group than to the union through collective bargaining (Hypothesis 5).*

The preceding discussion is based on the assumption that interest group membership has a stronger effect on desired control than the simple fact of ownership, but that ownership may lead some individuals to give up occupational interests in favor of common interests with all owners. Such individuals will have preferences for control over decision making that do not follow interest group lines. It is hypothesized that *workers who believe that a psychological labor-management partnership exists (Hypothesis 1b)* *will favor power equalization in decision making more than will workers who do not perceive such a partnership (Hypothesis 6).*

In summary, employees who become employee owners are expected to have their perceptions of actual ownership, partnership with management, and desired control over decisions affected by the amount of stock owned. Ownership itself, however, is expected to influence desired level of control over specific issues, but these perceptions may be reflected in occupational interest group status rather than the common interests created by joint ownership.

METHOD

Sample

The study took place in a small manufacturing firm located in a rural area of the northeastern United States. The plant, which had been part of a large conglomerate since 1955, manufactures high quality wooden library furniture. At the time of the study it employed 233 people. Of these, 55 were sales people working outside the local area. Taking part in the study were 163 people. Of these, 98 were blue-collar production workers, of whom about one third were highly skilled; 37 were nonsupervisory white-collar workers; 15 were at the middle management level, including shop and office supervisors; and 13 were top management employees. Of the plant's 178 resident employees, 15 were not available or chose not to participate when the study took place. One member of middle management did not respond in sufficient detail to the research instrument and was deleted from all analyses.

The company was formed in 1876 and is one of the area's main employers. In March 1976 the parent corporation announced its intention to liquidate the plant (which had been operating with a healthy furniture industry profit during its years as a subsidiary but not up to the profit margin required by the parent corporation) by March 1977, leaving 178 people out of work in an area where the unemployment rate was 13.7 percent. By September 1976, the employees had managed to buy the plant themselves with the help of $4 million in federal government and private bank loans and $1.8 million raised through sales of common stock to employees and area residents.

There are 3,500 stockowners, most of whom live within 50 miles of the plant, and most have small holdings. The plant's employees own 34 percent of all stock. Within the company, nonmanagerial workers own 65 percent of the stock; 35 percent is held by middle and top level management. The nonmanagerial workers are represented by two locals of a single national union, one for the production workers and one for the office employees.

The average age for the blue-collar workers and top managers was 48 years, for the office workers 40 years, and for the middle managers 45 years. Average education levels were 11 years for blue-collar workers, 13 years for both office personnel and middle management, and 15 years for top management. The mean tenure for production workers was 18 years, for the office workers 11 years, and for middle and top level management 21 years and 15 years, respectively. All blue-collar workers and top management were male. Among the office workers, 13 were male, 24 were female, and on the middle management level there were 12 men and 2 women.

Procedure

The study was conducted eight months after purchase from the parent corporation. The data used to test the present hypotheses were collected by questionnaires completed at the plant on company time. At the time these data were collected the researchers' involvement in the study of employee owned firms was well known to the employees through a series of site visits, earlier interviews with plant personnel, and exchanges of information on employee ownership. The company, which had enjoyed considerable public exposure because of its successful solution to the threatened plant closure, had agreed to "observation" by members of the research team.

One week before the survey was conducted, a letter was sent to all employees from the researchers to remind them of the upcoming survey. The questionnaire used to collect the data had been examined and approved by top management representatives and the two local union presidents. The employees completed the survey in small groups in the plant's conference rooms. The researchers and their assistants were present to give directions and explanations. Upon completion, each person put his/her questionnaire in an envelope, sealed it, and handed it over to the researchers to be taken directly from the plant.

Measures

Employees were asked to state how many shares of stock they had personally bought when the company was purchased. They also were asked to state the reason(s) why they had bought stock initially, by checking all of the following reasons that might apply: to save their job, as an investment, because a lot of other people chipped in so they thought they'd do it too, and because they believed in the idea of employees owning their place of work.

Perception of ownership was measured by asking about the extent to which one as an individual owned the company. The response scale ranged from 1 ("No, there is no real ownership") to 6 ("Yes, there is real ownership"). Subjects also were asked to state how much employees as a group and how much management owned the plant, using the same scale.

Labor-management partnership was assessed by a 3-item scale comprised of items designed to measure various aspects of a partnership. The items were extracted from a factor analysis of 40 items defining several dimensions, of which partnership was one. The items that clustered together on this scale and their factor loadings were: "Employees and management are equal partners at X (name of company)" (.74); "Employees have a say in what is done with X's profits" (.73); and "Before deciding on a big change, the management discusses it with the employees" (.67). Each item was measured on a 6-point scale, where response alternatives ranged from 1 ("Strongly disagree") to 6 ("Strongly agree"). The internal consistency estimate, using the Spearman-Brown prophecy formula, was .79.

Control or influence in the plant's decision making process, actual as well as desired, was assessed for seven issues over which employee control might be exercised: wages and benefits, the pension plan, the production process, hiring of management, investment in new equipment, planning for the company's future (new products, new markets), and the distribution of company earnings. These issues represent four levels of decisions. The first level—wages, benefits, and pension plans—represents issues of immediate concern to the workers over which they have some influence through collective bargaining. Decisions on the work process affect the workers directly but are usually made by management. Hiring of executives is a major personnel decision internal to the organization; and investment, planning, and distribution of profits are company level matters. This range of issues corresponds to Bernstein's (1976) hierarchy of areas over which worker participation has been experienced in different forms of industrial democracy.

Subjects stated how much influence or say each of three groups had over decisions made in the company about each of the seven issues, using a 6-point scale ranging from 1 ("Virtually no say at all") to 6 ("A great deal of say"). The three groups were: employees as a group not through the union, the union through collective bargaining, and management. In a different section of the survey, all employees were asked to state how much influence or say the different groups should have over each issue, using the same 6-point scale. Of the seven issues, the two concerning wages and pensions were combined into one scale (the estimate of internal consistency was .74), and investments, planning, and company profit decisions were combined into a policy scale, with a reliability estimate of .94.

Variables that could be used to obtain a better understanding of the findings from the study, such as alienation from the work itself, job satisfaction, and ambiguity in interpreting the stockownership role, also were measured. Work alienation was assessed with a 5-item scale developed by Miller (1967). Its items cover dislike for the work itself, the reward value of the work, a lack of pride and accomplishment, and opportunities to do jobs at which one is good. Its reliability estimate was .82. The General Motors' Faces Scale (Kunin, 1955) was used to measure overall job satisfaction. Stockowner ambiguity was measured with a 6-item scale, extracted from factor analysis. Items on this scale were concerned with the uncertainty about one's responsibilities and duties as an employee stockholder and the rights and privileges of worker stockowners to make decisions within and about the company. The estimation of internal consistency was .76. All items were assessed with 6-point verbally anchored scales.

RESULTS

The results are presented in three parts covering perceptions of ownership, desired control, and occupational interest groups. Subjects were classified into four occupational interest groups: blue-collar, white-collar, middle managers, and top managers. The managerial group was divided because middle managers were responsible only for day-to-day operations and did not play a role in top level decision making. Their hierarchical position was above the unionized workers, but their exclusion from top executive functions made their interest group status ambiguous.

Stockholdings, Perceptions of Ownership and Labor-Management Partnership

The scope of financial ownership within the plant is the major independent variable for Hypotheses 1 and 2 and helps interpret the meaning of ownership. Distribution of stockholdings among the groups of employee owners is presented in Table 1. Although the mean number of shares is larger among managerial ranks, ownership is widely distributed and each interest group has individuals with large and small shareholdings.

Subjects in each occupational group also were asked about the reasons for their stock purchases. Responses are shown in Table 2. The data across the four reasons are not exclusive. The employees were asked to indicate as many motives for their purchase decisions as might apply. Saving jobs

TABLE 1
Frequency Distributions and Summary Statistics for the Number of Shares Owned by Different Groups of Employees

Number of Shares Owned Up to and Including:	*Blue-Collar Workers (N=82)*		*White-Collar Workers (N=29)*		*Middle Management (N=14)*		*Top Management (N=13)*	
	N	*%*	*N*	*%*	*N*	*%*	*N*	*%*
200	20	(24)	8	(28)	0	(0)	0	(0)
500	31	(38)	9	(31)	3	(21)	3	(23)
1000	20	(24)	11	(38)	4	(29)	3	(23)
2000	8	(10)	1	(3)	4	(29)	3	(23)
5000	2	(2)	0	(0)	3	(21)	3	(23)
7500	1	(1)	0	(0)	0	(0)	1	(6)
Mean	739		545		1350		2058	
SD	936		390		1146		2054	

TABLE 2
Reasons for Buying Stock in the Company, as Expressed by Four Organizational Groups

Reason	*Blue-Collar Workers (N=82)*		*White-Collar Workers (N=29)*		*Middle Management (N=14)*		*Top Management (N=13)*	
	N	%	*N*	%	*N*	%	*N*	%
To save my job	77	(93)	25	(86)	11	(78)	8	(62)[a]
As an investment	37	(45)	13	(45)	8	(57)	4	(38)
A lot of other people chipped in so I thought I'd do so too	13	(16)	1	(3)	2	(14)	0	(0)
Because I believe in the idea of employees owning their own plant	35	(42)	14	(48)	7	(50)	11	(85)[a]

[a]Significant differences (X^2) between managers and blue-collar employees ($p < .01$).

was the major motivator behind the employees' decisions. Blue-collar workers, in particular, considered the investment aspect of the purchase, and about half of the workers, including the majority of the management, said their decision to buy the plant was based on a positive reaction to the idea of employee ownership. Employee ownership means local autonomy, or freedom from constraints and capricious action by a corporate absentee owner, which is an attractive position for any management (Gurdon, 1978). Though saving jobs was the predominant reason given for investments, there were multiple motives behind the purchases. Employee owners interpreted their ownership status as more than just the right to a job.

Hypotheses 1a and 1b predicted that the extent of financial involvement in the company would be positively related both to perceptions of personal ownership and to the existence of a labor-management partnership. Table 3 presents the correlations between the number of shares owned and employee perceptions among the four occupational groups. Correlations between the number of shares owned and perceptions of the extent to which employees collectively as well as management own the plant are given. Group mean scores provide a clear picture of how employees see their status within their firm. All employees, whether stockowners or not, are included in this analysis.

Table 3 shows that within groups of employees there are no significant positive correlations between the number of shares owned and perceptions of ownership or partnership. Perhaps employees with different motivations for buying stock see their ownership and partnership status from different perspectives. However, a stepwise multiple regression analysis with each investment reason as independent variables (dummy coded) showed that the motives behind the stock purchases did not contribute significantly to the variance in employee perceptions.

TABLE 3
Correlations Between Number of Shares Owned and Employees' Perceptions of Company Ownership and Labor-Management Partnership[a]

Perceptions of Who Owns the Company	Blue-Collar Workers (N=98)		White-Collar[+] Workers (N=37)		Middle Management (N=14)		Top Management (N=13)	
	r	$\bar{X}$	r	$\bar{X}$	r	$\bar{X}$	r	$\bar{X}$
I (as a person)	.10	(2.57)[b,c]	.24	(2.28)[b,c]	.12	(3.27)	.23	(4.08)
Employees as a group	-.04	(3.50)[d]	-.16	(3.52)[d]	-.01	(4.07)	.31	(4.64)
Management	.07	(4.64)	-.40*	(4.69)	-.22	(4.40)	.32	(4.64)
Labor-Management Partnership	.13	(2.88)	-.11	(2.78)	.09	(2.88)	.27	(3.28)

[a] Numbers in parentheses are group mean scores.
[+] Relationships are moderated by stockholder role ambiguity.
[b] Significant differences between personal ownership and management ownership, $p<.001$.
[c] Significant differences between personal ownership and employees' ownership, $p<.001$.
[d] Significant differences between employees' ownership and management's ownership, $p<.001$.
*Correlation is significant, $p<.05$.

Ambiguity in the employee-stockowner role also could affect the relationship between stockholdings and perceptions, because employees with a clear understanding of their rights and duties would be able to see a direct relationship among conditions of actual ownership and psychological ownership and partnership, whereas those experiencing role ambiguity would not. Moderated multiple regressions (Zedeck, 1971) with stockholding, role ambiguity, and their interaction regressed separately onto each ownership and partnership perception showed significant but weak effects of ambiguity and the interaction.

As a result, blue-collar and white-collar samples were split into two groups at the median of their respective role ambiguity scores, and zero-order correlations were computed for stockholdings and ownership and partnership perceptions. The managerial samples were too small for such an analysis and were excluded. Role ambiguity had no effect on these relationships among blue-collar workers. Among the white-collar workers who reported role ambiguity ($N=20$), there was a positive relationship between stockholdings and perceptions of personal ownership (.44, $p<.05$), and a negative relationship between stockholdings and beliefs about management's ownership of the firm (-.43, $p<.05$). White-collar workers low on role ambiguity ($N=17$) saw no relationship between actual ownership and felt personal ownership, but they shared the belief that the more stock they owned, the less management owned the plant (-.38, n.s.). Furthermore, shares held were negatively related to perceptions of ownership for employees as a collective (-.59, $p<.01$). No effects of role ambiguity were found on the stockholdings-partnership relationship. That the moderator effect of role ambiguity was found only for the white-collar workers and was contrary to expectations points to the peculiar position of this occupational group when they share ownership. The ambiguous role of the office worker will be used to explain this result and the results on other hypotheses.

Both blue-collar and white-collar workers, regardless of role ambiguity, perceive management as owners of the company more than they see themselves as owners. There are no differences in beliefs about a labor-management partnership as held by the four groups, however.

Because ownership may reflect itself in the act of purchasing rather than in the amount of capital invested and ownership per se has been found to influence employee attitudes in other research (Gurdon, 1978; Long, 1977), groups of stockholders and nonstockholders were compared on ownership perceptions. There were 24 employees (16 production workers and 8 office workers) who did not own stock in the plant. *T*-tests for differences between mean ownership perceptions showed that stockholders as individuals considered themselves to be owners of the firm more so than did the employees not holding shares ($\bar{X}=2.65$ and $\bar{X}=1.73$, respectively, $t=2.74$, $p<.01$). No differences were found for the beliefs that employees as a group or the management owned the plant. Nor were there any significant differences between the ways in which stockholders and nonstockholders viewed the existence of a labor-management partnership. Although Hypotheses 1a and 1b clearly are not supported, there is a difference in perceived personal ownership between owners and nonowners, regardless of the amount of stock held. The stockholders' belief in their ownership status is not substantial, however, given a mean of 2.65 on a 6-point scale.

Stockownership and Desired Control over the Decision Process

Hypothesis 2 stated that the larger capital investment an employee has made in a firm, the more control he should want to exert over decisions affecting the future financial welfare of the company. Correlations between the number of shares owned and desired personal influence over policy level decisions were nonsignificant for all four groups. Hypothesis 2 thus was not supported. However, further analyses showed positive and significant correlations between stockholdings and the amount of influence granted management on all issues for both blue-collar and white-collar workers (median $r=.26$, $p<.05$). That larger personal investments should be accompanied by a preference for more managerial control is the opposite result from the one predicted. This result becomes important to the interpretation of results regarding other hypotheses.

Hypothesis 3 stated that nonmanagerial employee owners will prefer an internal decision making process that maintains the control or influence they have had over collectively bargained issues (e.g., wages and pensions) but that increases their influence over policy level matters. Data are presented in Table 4. Because stockholders and nonstockholders agreed completely on the preferred distribution of power, all employees have been included in these analyses.

The central issue in testing Hypothesis 3 is the extent to which nonmanagerial workers prefer power-equalization between labor and

TABLE 4
Preferences for a Distribution of Power in Organizational Decision Making Among Blue-Collar, White-Collar, and Managerial Employees

	Who Should Have Power?					
Organizational Group and Area of Decision Making	*Employees as a Group*		*Union Through Collective Bargaining*		*Management*	
	$\bar{X}$	*SD*	$\bar{X}$	*SD*	$\bar{X}$	*SD*
Blue-Collar Workers (N = 98):						
Wages, benefits, pension	3.33	(1.62)	5.10	(1.13)[a]	4.23	(1.13)[b,c]
Production process	3.15	(1.69)	4.28	(1.50)[a]	4.77	(1.40)[b]
Hiring of management	2.56	(1.73)	3.15	(1.90)[a]	4.48	(1.61)[b,c]
Policy level decisions	2.98	(1.56)	3.97	(1.35)[a]	4.55	(1.17)[b,c]
White-Collar Workers (N = 37):						
Wages, benefits, pension	4.11	(1.22)	4.47	(1.29)	4.50	(1.09)
Production process	3.70	(1.54)	3.81	(1.27)	4.70	(1.24)[b,c]
Hiring of management	3.03	(1.23)	3.18	(1.80)	4.74	(1.23)[b,c]
Policy level decisions	3.80	(1.14)	3.78	(1.30)	4.56	(1.14)[b,c]
Middle Level Management (N = 14):						
Wages, benefits, pension	4.27	(.99)	4.19	(1.54)	5.03	(.99)
Production process	4.00	(1.08)	3.43	(1.40)	5.07	(1.21)
Hiring of management	3.33	(1.50)	2.50	(1.62)	5.50	(.91)[b,c]
Policy level decisions	3.48	(1.45)	2.82	(1.38)	5.31	(.62)[b,c]
Top Management (N = 13):						
Wages, benefits, pension	4.14	(1.34)	2.50	(1.20)[a]	4.81	(1.01)[c]
Production process	3.73	(1.19)	2.36	(1.36)[a]	4.91	(.83)[b,c]
Hiring of management	2.20	(1.23)	1.40	(.70)	5.60	(.52)
Policy level decisions	3.58	(1.41)	2.06	(1.05)[a]	5.18	(.60)[c]

[a] Significant differences between employees as a group and the union through collective bargaining ($p < .001$).

[b] Significant differences between employees as a group and management ($p < .001$).

[c] Significant differences between the union through collective bargaining and management ($p < .001$).

management. *T*-tests for correlated means were computed between the amount of influence that each interest group believes should be accorded the employees and the union vis-á-vis management. Due to the possibility of Type I errors in sets of multiple comparisons, significant differences are indicated only if they are at or below the .001 level of confidence (Ryan, 1959).

Both workers and managers agree that management should have the most influence over policy and top managerial personnel decisions, and there is no preference among blue-collar or white-collar workers for power equalization on issues regarding the plant's future. However, issues that directly and immediately affect the welfare of the work and that traditionally are subject to collective bargaining are seen by white-collar workers as areas in which there should be labor-management power equalization. But they are seen by blue-collar workers as issues that the union, rather than the management, should dominate.

Despite a lack of interest in power equalization, members of the nonmanagerial work force may still want more power than they had under traditional ownership. Comparisons between the amount of influence that the respondents felt that employees, the union, or the management have and what they should have (using *t*-tests for correlated means) show that both blue-collar and white-collar workers want the union as well as employees as a group to have more influence over all issues than they presently experience (all differences are significant at the .001 level); but they prefer management to retain the amount of influence it has over all levels of decision. Both managerial levels prefer the present distribution of influence (there are no significant differences between actual and preferred control), in which employees and the union have some say over issues of direct concern to them but have little influence over organizational policy level matters.

Occupational Interest Groups

Hypotheses 4 and 5 suggest that members of specific interest groups within an organization prefer an internal power distribution that favors their own groups. Blue-collar workers prefer the union to have more influence in decision making than an employee group outside the collective bargaining process; white-collar workers want labor-management participations through an employee group; and the management, if it is willing to share power, should prefer an employee group as a partner rather than the union.

In Table 4, *t*-tests for correlated means were used to compare interest group preferences for each occupational group. The superscript *a* in the table denotes differences in preferences between a union and an employee group. Over all issues, the blue-collar workers prefer union influence to power granted an employee group, supporting Hypothesis 4. The white-collar workers do not show a preference in power distribution. They assigned as much influence in decision making to the union as to an employee group outside collective bargaining. To the extent that management is willing to share some of its power (in this case, management means top management because the middle management is not involved in executive decision making), it prefers that power be granted to the employees outside collective bargaining, as predicted by Hypothesis 5. In summary, both the production workers and top management responded to the issue of organizational power in accordance with their interest group membership, but the office workers gave equal preference for the union and an employee group. (The white-collar sample was 65 percent female. To ensure that responses were not a function of gender, all analyses involving the white-collar sample were run separately for males and females. There were no differences between the two sets of respondents on any of the variables reported in this study.) The middle managers did not prefer an employee group to the union in a power sharing scheme, but clearly preferred to maintain power differences between labor and management.

The data show the relative importance of interest group membership and the weakness of stockownership in predicting the desired distribution of internal control. However, explanations for the group preferences may lie at the individual level, particularly with respect to background characteristics such as education and perceptions of work, including stockholder role ambiguity, alienation, and labor-management partnership in the firm.

Because expertise and knowledge about organizational functions influence the desire for participative decision making (Locke & Schweiger, 1978; Mulder & Wilke, 1970), formal education could increase an individual's interest in participation and power equalization. Similarly, role ambiguity might adversely affect a worker's preference for more power vis-a-vis management because the rights and duties of an employee-owner

TABLE
Multiple Regressions on Preferred Power Role-Ambiguity and Work Alienation

			Who Should
	Employees as a Group		
Organizational Group and Area of Decision Making	*Independent Variable*	*r*[b]	*beta*[c]
Blue-Collar Workers (N = 72)			
Wages, benefits, pension	Partnership	.11	-.11
		$R^2 = .02$	
Production process	Alienation	-.12	-.12
		$R^2 = .03$	
Hiring of management	Education	-.17	-.15
		$R^2 = .07$	
Policy level decisions	Ambiguity	-.06	-.06
		$R^2 = .01$	
White-Collar Workers (N = 31)			
Wages, benefits, pension	Ambiguity	.42*	.58**
	Partnership	.11	.39**
		$R^2 = .35$	
Production process	Education	.30	.30
		$R^2 = .13$	
Hiring of management	Ambiguity	.25	.42*
	Partnership	.22	.48*
		$R^2 = .25$	
Policy level decisions	Education	.34	.30
		$R^2 = .18$	
Top Management (N = 11)			
Wages, benefits, pension	Education	.71**	.70
		$R^2 = .62$	
Production process	Alienation	-.59	-.59*
		$R^2 = .77$	
Hiring of management	Education	.79**	.70*
		$R^2 = .69$	
Policy level decisions	Education	.63*	.55
		$R^2 = .42$	

[a] *N* is reduced due to case-wise deletion of subjects.
[b] *r* = zero-order correlation coefficients (two-tailed tests).
[c] beta = standardized regression coefficient.
*$p < .05$; **$p < .01$; ***$p < .001$.

are not fully understood. A belief in a labor-manager partnership should lead both workers and managers to want to share power. The exact role that alienation from the work itself could play is less obvious. People who are immersed in their work and find it a rewarding, challenging experience may prefer to spend their efforts on the work itself rather than funnelling energy and interest into participative decision making. On the other hand, people who are not alienated from their work may take a more positive view of their entry into other aspects of organizational life and want to expand their arena of operations. Because the work itself is a major component of job satisfaction, similar arguments could be made about its effects on power preferences. Because of the belief that the nature of the work rather than the overall reaction to the job is the important contributor to a

5
with Education, Partnership,
as Independent Variables[a]

Have Power?					
Union Through Collective Bargaining			*Management*		
Independent Variable	*r*	*beta*	*Independent Variable*	*r*	*beta*
Education	.28*	.25*	Alienation	.49***	.50***
Partnership	-.21	-.19*	Education	.16	.18*
	$R^2 = .15$			$R^2 = .29$	
Alienation	.18	.20*	Alienation	.39***	.41***
	$R^2 = .05$			$R^2 = .17$	
Alienation	-.12	-.13	Alienation	.35**	.37**
	$R^2 = .04$			$R^2 = .14$	
Ambiguity	-.15	-.15	Alienation	.38**	.43***
			Partnership	-.12	-.19
	$R^2 = .06$			$R^2 = .20$	
Ambiguity	.14	.22	Partnership	.32	.29
	$R^2 = .06$			$R^2 = .11$	
Education	.20	.22	Ambiguity	-.37*	-.30
	$R^2 = .10$			$R^2 = .26$	
Ambiguity	.31	.53**	Ambiguity	-.17	-.22
	$R^2 = .22$			$R^2 = .04$	
Partnership	.07	.14	Partnership	.22	.09
	$R^2 = .03$			$R^2 = .10$	
Alienation	-.53	-.53	Alienation	.57	.63
	$R^2 = .34$			$R^2 = .58$	
Partnership	-.61	-.60	Education	.77**	.65
	$R^2 = .67$			$R^2 = .66$	
Partnership	-.81**	-.71*	Partnership	-.54	-.49
	$R^2 = .72$			$R^2 = .33$	
Partnership	-.68*	-.65	Alienation	.50	.44
	$R^2 = .49$			$R^2 = .56$	

desire for participative decision making (Hackman & Oldham, 1975; Hulin & Blood, 1968; Wanous, 1974), work alienation is the focal variable.

To test this assumption zero-order correlations were computed between job satisfaction and power preferences. No significant relationships were found among white-collar and managerial employees. Weak and mostly nonsignificant correlations were found in the blue-collar sample ($r = .19$, n.s.). Correlations between job satisfaction and alienation were .50 ($p < .001$) for the blue-collar workers, .33 ($p < .05$) for white-collar workers, and nonsignificant for the managers. (Work alienation is reversed scored, and a high score indicates nonalienation, or interest and involvement in work.)

Because these individual difference factors may operate differently on members within each interest group, all analyses were conducted by group. Due to extreme multicollinearity between partnership, alienation, and ambiguity (correlations ranged from -.80. to -.55) and the small sample size, the middle management group was excluded.

Moderated regression analyses showed no significant interaction effects among the four independent variables. Education, role-ambiguity, labor-management partnership, and work alienation then were regressed on power preferences in a stepwise fashion. The results presented in Table 5 contain the variable that entered first in the regression equation for each power score, the zero-order correlation, and the standardized regression weight, as well as any additional variable with a significant beta weight. Because of the large number of regression equations solved with relatively few cases, attention should be paid to patterns of results rather than to individual significant *R*s or beta weights (Mosteller & Tukey, 1977).

The lower the level of alienation from work among blue-collar workers, the more they prefer to see power in the hands of management, but power preferences for an employee collective or the union are not affected by any of the independent variables. The pattern of relationships is less clear among the white-collar workers. Role-ambiguity and partnership beliefs contribute positively to the explanation of power preferences for employees as a group and the union. Because ambiguity and partnership were negatively correlated (-.49, $p < .05$), partial correlations between partnership beliefs and preferred power controlling for ambiguity were computed. These were .40 ($p < .05$) and .42 ($p < .05$) for employee power and union power, respectively.

Top management are consistent in their power preferences for employees as a group and the union. The more formal education the managers have, the more power they are willing to place in the hands of an employee group. However, the stronger their belief in partnership, the less power they want the union to have.

Hypothesis 6 suggests that perceptions of a labor-management partnership may be related to preferences for a more equal distribution of power. This hypothesis was tested first by regressing partnership beliefs (controlling for role ambiguity, work alienation, and possible interactions) on the difference between the power management should have and the power labor (represented by the union) should have over each of the four areas of decision making. A difference in power preferences for management and union indicates a lack of interest in power equalization.

Among the workers, partnership was the only significant variable in the regression equations. It was negatively but weakly related to a power difference between labor and management. No significant relationships were found among managers between partnership and power differences, and the moderated regression analyses revealed no significant interactions of partnership, ambiguity, or alienation. Workers were separated into two groups based on their scores on the partnership variable. A high partnership group with scores of 5 or 6 on a 6-point scale ($N = 15$) and a low partnership group with scores of 1 and 2 ($N = 27$) were compared with respect to their power preferences for labor and management. These data are presented in Table 6.

TABLE 6

Preferences for a Distribution of Power Between Labor and Management by Two Groups of Workers Who Differ in Beliefs about the Existence of a Labor-Management Partnership

	Who Should Have Power?				
	Labor, Represented by the Union		*Management*		
Respondent Group and Area of Decision Making	$\bar{X}$	*SD*	$\bar{X}$	*SD*	*t-value*
Partnership Believers (N = 15)					
Wages, benefits, pension	4.77	(1.23)	4.58	(1.54)	.43
Production process	4.38	(1.56)	4.92	(1.44)	-.98
Hiring of management	3.62	(1.98)	4.69	(1.75)	-1.51
Policy level decisions	3.33	(1.71)	4.69	(1.27)	-2.11
Partnership Nonbelievers (N = 27)					
Wages, benefits, pension	5.26	(.92)	4.28	(.89)	4.69*
Production process	4.41	(1.55)	4.70	(1.17)	-.93
Hiring of management	3.15	(1.95)	5.00	(1.00)	-4.13*
Policy level decisions	3.35	(1.57)	4.77	(.74)	-4.35*

*$p < .001$

T-tests for correlated means showed that people who believed in the existence of a partnership preferred that power be distributed evenly to labor and management in any area of decision making. The workers who felt that there was no partnership, however, wished to retain the typical interest group pattern of power distribution in which labor has more influence over bread-and-butter issues and management controls organizational level issues. These findings, which support Hypothesis 6, not only illustrate the importance of perceptions of partnership for the dissolution of interest group reactions, but also point out the astonishingly small percentage of the financial partners (11 percent) who see themselves in a psychological partnership.

DISCUSSION

To those who, like Herrick and Maccoby (1975), have emphasized worker self-governance or increased worker autonomy as an integral part of a better quality of working life, employee owned firms offer a unique potential for work place democratization. This study was conducted eight months after a transfer of ownership had taken place. The euphoria of having saved a large number of jobs still existed, and no formal attention had yet focused on the issue of an internal distribution of power or the possible forms that joint decision making might take. However, these initial interpretations of employee ownership are essential baseline data for research on worker participation in management. They indicate the extent to which power sharing is wanted before any effort has been made to teach, train, or create a consciousness about ownership rights and joint decision making in either nonmanagerial or managerial employees (Pateman, 1970).

The preferred distribution of control in organizational decision making was examined because it was assumed that the changes from wage earner to part owner would create a difference in the employee owners' definitions of their roles and rights within the organization. However, legal ownership, or the actual status change, was not associated with psychological or felt ownership. Management was still seen as the de facto owners of the company to a much larger extent than the workers saw themselves as owners, either individually or collectively. Nor did they see themselves as partners with management despite financial investment.

Rather than having any "collective consciousness" of ownership, many employee owners saw themselves as traditional financial investors. Of the nonmanagerial work force who bought stock as investments (Table 1), 75 percent belonged to the class of large contributors (500 to 7500 shares each). "Investment" implied not only speculation in stock with the prospect of capital gains but also the investment in a job. Gurdon (1978) in a recent study of an employee owned firm in the textile industry identified similar motives among the worker owners.

These perceptions of ownership may have resulted from the distribution of shares as well. Nonmanagerial workers as a group owned almost twice as much stock as management, but the number of shares held by the individual workers was far less than that owned by the individual manager. Seen from this individual perspective, management simply owned more.

Financial ownership did not generate interest on the part of managers or workers for active participation in organizational decision making. Though there was a gap between actual and desired influence in decision making among the workers (which is a common finding among workers in traditional hierarchical organizations; see, for example, Tannenbaum, 1968; Tannenbaum et al., 1974), there was neither pressure for power equalization nor for diminution of management's position in the decision making hierarchy.

This basic delegation of control over organizational level issues has several possible causes. Pateman (1970) has noted that people with no prior practice of behaving democratically have to overcome cumulative inertia in order to take an active part in social, political, and organizational life. This inertia is not solely a function of a lack of education and experience or the fear of subsequent failure (Mulder & Wilke, 1970). It may be due simply to lack of interest, a belief in a traditional division of labor, and the practical utility of letting managers manage.

The present work force contained a high percentage of skilled labor. Jobs that are already complex, varied, involve a "whole" product, and require thought and judgment satisfy the criteria for enriched jobs (Hackman & Oldham, 1975). Occupants of such jobs may have no interest in enriching the work further by including in it participative decision making on the organizational level. The strong effect of nonalienation, or the enjoyment in and personal identification with work, on the desired delegation of power to management among blue-collar workers suggests an enrichment threshold below which work must fall before interests are funnelled towards other activities.

When the work force is older, of long tenure, accustomed to a traditional division of labor, and subscribing to the conservative work ethic of rural populations (Hulin & Blood, 1968), it may simply see management as the legitimate power holders and fail to challenge the existing order despite changes in the ownership of capital. Most of the current employee-owned firms are, in fact, in rural areas (Stern & Hammer, 1978).

There is, in addition, some sound economic logic behind the decision to leave decision making to managers. The data showed that the more workers have invested in a firm, the more power they prefer to delegate. The more equity one has in a company the more one stands to lose should the venture fail, and delegating decision making to acknowledged experts seems a judicious choice.

The present findings should not be taken to mean that blue-collar workers in employee owned firms in general will be disinclined towards a form of power sharing that goes beyond collective bargaining. But the findings do indicate that factors such as the nature of the work being performed and traditional work values can be powerful constraining forces on a leap towards industrial democracy.

White-collar workers differ from production employees by occupying an ambiguous position. In general, their social class identification places them in the middle class, and they feel closer to management than to production workers in status and philosophy (Blum, 1971). In this plant they differed from blue-collar workers by expressing only weak support for power exercised through the union and by the importance of the stockholder role to their power preferences and partnership perceptions. The office workers who expressed role ambiguity over the dual role of worker and owner felt that employee stockholding had changed the traditional ownership pattern; management's status had declined and their own had risen. This shift in the balance of ownership was expressed as a preference for more power in the hands of the employees and less in the hands of management. The employees who perceived their role clearly, however, realized its limitations and did not believe that control automatically shifted with ownership.

The white-collar workers' ambiguous position may lead to their loss of power in the long run. As workers have the opportunity to increase their influence in organizational decision making, the influence shared by management with workers most likely is to come on job related matters of interest to blue-collar workers and not on major strategic decisions as the white-collar workers would prefer (Bernstein, 1976).

The ambiguity of middle level occupational positions also affects the middle managers. They agreed with top management on the desirability of a power differential between labor and management, but did not show the sharp distinction in a preference for a power delegation to an employee group over a union that top managers did.

Top managers' preference for a power distribution that excludes the union is predictable from their traditional occupational position, but individual differences in the interpretation of employee stockownership augment the understanding of this main effect. The nature of collective bargaining creates an adversary relationship between labor and management in general—a relationship not congruent with beliefs in a labor-management partnership. Partnership implies goal agreement and collaboration, and the more managers perceived that such a partnership existed, the less power they wanted in the hands of their traditional collective bargaining adversary.

Education also plays a role in top management's preferences to grant power to employees as a group. Better educated managers appear to be more open to changes in traditional power distributions and more sensitive to the rights of their co-owners.

Despite the insights provided by an examination of individual differences in the present research, the differences played a relatively modest role in explaining the data. The similarities in pattern of responses between the employee owners and traditional nonowning labor are apparent throughout the study. In this regard, the results are interpretable within the framework of collective bargaining theory. The preferences shown in this study for a distribution of power are affected by the nature of the issue. Workers wanted power equalization over traditional labor-management bargaining issues such as wages and pensions in which one party's gain is the other's loss. These "distributive" issues (Walton & McKersie, 1965) stand in contrast to "integrative" ones in which both parties may gain (or for that matter, lose). In an employee owned firm, those areas of decision making that affect the future welfare of the entire company are integrative ones. In distributive bargaining, there should be power equalization if the outcome is not to be a foregone conclusion. But with integrative issues, labor and management stand or fall together, reducing the need for a power distribution that equalizes the strength of the parties.

If integrative issues become the focus of interest group conflict in an employee owned firm, they can easily become distributive ones. As long as a management acts for the common weal, a work force with little perceived need for participation will have no reason to change the existing power structure. If management uses its decision making power in favor of its own specific interests, worker reticence about participative decision making, regardless of its causes, will probably be overcome.

Findings in this study of a single firm are largely confirmed by other work in employee owned companies (Gurdon, 1978; Long, 1977). Longitudinal study is required to determine whether employee owners will continue to act in a traditional manner or begin to act as participating co-owners of these firms. Of particular interest are companies in the process of transferring stock to their employees through employee stock ownership plans (Conte & Tannenbaum, 1978; Stern & Comstock, 1978) because labor and management may begin to have real financial power in these organizations. At the present time, there is no overwhelming evidence for the presence of, or the preference for, either power equalization or heavy worker involvement in organizational level decisions. However, as an increasing amount of equity is transferred to the workers in more and more firms, both the actual and the desired distributions of organizational power may very well change.

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Privacy at Work: Architectural Correlates of Job Satisfaction and Job Performance[1]

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Three correlational studies examined relationships among architectural privacy, psychological privacy, job satisfaction, and job performance. Results of all three studies showed architectural privacy associated with psychological privacy. Both forms of privacy were associated with satisfaction with workspace and job satisfaction. Architectural privacy showed a limited, positive relationship with job performance in clerical and mechanical employees.

Aside from the research on engineering psychology (Chapanis, 1976; McCormick, 1976) the field of industrial and organizational psychology has paid little attention to the physical surroundings of people at work (Porter, Lawler, & Hackman, 1975). Research on the role of the physical setting in interpersonal behavior in organizations has been especially uncommon (Sundstrom & Sundstrom, 1981) although social and environmental psychologists have developed theories that might apply (Altman, 1974, 1975; Proshansky, Ittelson, & Rivlin, 1976; Sundstrom, 1977).

This study applies ideas from social and environmental psychology to work settings. It concerns the role of privacy in job satisfaction and job performance. Privacy is defined in two ways: as a psychological state and as a physical feature of the environment. *Psychological privacy* comes from a sense of control over access to oneself or one's group. It includes control over transmission of information about oneself to others and control over inputs from others (Altman, 1975; Margulis, 1977; Marshall, 1972). This concept of privacy assumes that people try to maintain an optimal level of social contact, and dissatisfaction results from being in situations that deviate from what a person considers optimal (Sundstrom, 1977). Too little social contact might produce feelings of isolation (Wohlwill, 1974); too much might produce crowding (Sundstrom, 1975, 1978).

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Architectural privacy refers to the visual and acoustic isolation supplied by an environment. A work area completely enclosed by soundproof walls with lockable doors embodies a high degree of architectural privacy; a large room in which many people occupy an undivided space would give minimal privacy. Architectural privacy may contribute to psychological privacy because people in private quarters can control their accessibility to others more easily than in open and visible places.

Compared with occupants of private workspaces, those in nonprivate areas may be expected to show more interaction with co-workers and to experience more noise and distractions. Evidence for this comes from research on the popular *open plan office*, which uses no walls and few partitions and minimizes distances between co-workers whose jobs call for contact with each other (Pile, 1978). In research comparing conventional offices with open arrangements, workers in open plan offices generally report having less privacy, spending more time talking, hearing more noise, and experiencing more distractions (Brookes, 1972; Brookes & Kaplan, 1972; Boyce, 1974; Ives & Ferdinands, 1974; Hundert & Greenfield, 1969; McCarrey, Peterson, Edwards & VonKulmiz, 1974; Nemecek & Grandjean, 1973; Riland & Falk, 1972; Zeitlin, 1969).

For people with repetitive tasks, a nonprivate workspace might provide two advantages. First, those who find their jobs boring might find that contact with other people provides a source of stimulation. Second, the evidence for *social facilitation* of performance of simple tasks (Geen & Gange, 1977) suggests better performance of routine tasks in nonprivate areas. However, with minimal privacy the amount of social contact might exceed the optimum even for a person doing a routine task, and the worker might feel crowded. Crowding might produce discomfort and downgrade job performance (Sundstrom, 1978). By this reasoning, people with routine tasks might feel most satisfied and work most effectively in areas accessible to co-workers provided they do not feel crowded. As the complexity of the job increases, the desired amount of social contact may decrease. People with complicated tasks may require greater freedom from distraction and consequently may require more architectural privacy for greatest job satisfaction and best job performance.

The hypotheses of this research were:

1. Architectural privacy is associated with psychological privacy.

2. Low levels of both architectural and psychological privacy are associated with social interaction, noise, distraction, and in extreme cases, crowding.

3. a. For routine tasks, job satisfaction and job performance are inversely related to both architectural and psychological privacy (except in cases of crowding).

b. For complex tasks, job satisfaction and job performance are positively related to both architectural and psychological privacy.

STUDY I

This study was conducted among upper level state administrators and so included participants with complex, demanding work. Those in architecturally private spaces were expected to report greater psychological privacy and express greater satisfaction with their workspaces than occupants of more accessible places.

Method

Participants—About 150 administrative employees of the State of Tennessee received questionnaires, and 85 participated in the study (the return rate was about 57 percent). All participants were either heads of administrative units (departments, sections, divisions) or assistants to such administrators.

Procedures—Each participant received a questionnaire in the mail, along with an invitation to attend a one-day workshop on decisions about design. Responses were returned by mail. The questionnaire included questions about participation in the process of design and perceptions of workspaces. Only the results of the latter are reported here. At the workshop participants heard a summary of the results.

Questionnaire—To assess characteristics of workspaces, the questionnaire asked whether or not the participant's workspace was enclosed by partitions or walls, whether it had a door, whether a co-worker worked within 10 feet of the participant's desk, whether a co-worker was visible from where the participant worked, and whether the participant's desk was visible from his or her supervisor's workspace. These questions were answered "yes" or "no." Questions designed to assess perceptions of workspaces asked for ratings on 7-step scales: dull—stimulating; ugly—aesthetic; drab—colorful; not private—private; spacious—crowded; quiet—noisy. Two other questions asked for ratings on 7-step scales of satisfaction with the workspace and the extent to which the workspace facilitated the participant's work.

Results

Most of the 85 participants said their workspace was enclosed from other work areas by walls or partitions (80 percent) and had a door (75 percent). While only a few worked in areas visible to their supervisors (18 percent), the majority worked within 10 feet of a co-worker (71 percent), and half (51 percent) could see at least one co-worker. Ratings indicated that participants found their workspaces moderately spacious ($\bar{X}=4.3$ on a 7-step scale), stimulating ($\bar{X}=4.2$); colorful ($\bar{X}=4.1$); aesthetic ($\bar{X}=4.3$); relatively private ($\bar{X}=4.5$); and generally satisfactory ($\bar{X}=4.9$). Ratings of noise were moderate ($\bar{X}=3.8$). Participants indicated that their workspaces facilitated their work ($\bar{X}=4.6$).

To test the hypotheses, correlation coefficients were calculated for each pair of items on the questionnaire using point-biserial r or phi in cases where one or two variables were dichotomous (see Table 1). Ratings of workspaces as stimulating, aesthetic, and colorful were combined into a composite variable called "pleasant place."

TABLE 1
Intercorrelation of Variables Measured Among 85 Upper-level Administrators

	Variable (listed by number)									
Variable	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
Features of workspace										
1. Partitions or walls	—									
2. Co-worker within 10 feet	-.14	—								
3. Co-worker visible	-.30*	.13	—							
4. Door	.23*	-.13	-.12	—						
5. Visible to supervisor	-.09	.18	.13	-.03	—					
Perceptions of workspace										
6. Pleasant place	.08	-.05	-.06	.26*	.09	—				
7. Private	.33*	-.14	-.29*	.50*	-.08	.48*	—			
8. Crowded	-.15	.17	.12	-.21*	.13	-.18	-.22*	—		
9. Noisy	-.25*	.24*	.05	-.31*	.09	-.27*	-.54*	.28*	—	
10. *Satisfaction with workspace*	.22*	-.03	-.15	.44*	.00	.67*	.54*	-.41*	-.49*	—
11. *Workspace facilitates work*	.15	-.08	-.24*	.40*	-.04	.62*	.56*	-.40*	-.52*	.79*

*$p<.05$. Of 55 correlation coefficients, 28 reached significance.

To supplement the zero-order correlation matrix, multiple linear regression analyses were employed. Forward stepwise solutions were used, retaining only variables that produced a partial F-statistic significant at $p<.10$ (Aitkin, 1974).

Privacy—Workspaces received higher ratings on privacy when they were partitioned from other areas, had a door, and neighboring co-workers were not visible. Regression of the ratings of privacy on the "features of workspace" (from Table 1) yielded a multiple R^2 of .32 ($F=10.21$, $df=2,82$; $p<.05$).

Noise and Crowding—Workspaces within 10 feet of co-workers received higher ratings on noise, whereas enclosed areas were rated less noisy. Privacy was negatively related to both crowding and noise.

Job Satisfaction and Performance—Because participants in this study had complex jobs, only the corresponding hypothesis (number 3b) could be addressed. No measures of job performance were available, but measurements were possible for the degree to which the workspace facilitated work, which was positively related to ratings of privacy. Physical features of the workspace were also associated with "facilitates work" (i.e., having a door and being in an area in which co-workers could not be seen). Regressing "facilitates work" on the "features of the workspace" variables produced an R^2 of .19 ($F = 9.41$, $df = 2{,}82$; $p < .05$).

STUDY II

This study involved a small group of clerical workers with relatively routine, repetitive work. It was predicted that people in accessible, nonprivate places would report more noise, distraction, and visiting with co-workers but would be more satisfied with their jobs. An extension of the social facilitation hypothesis predicts better performance of such jobs in nonprivate areas. The study involved a questionnaire and direct measurement of features of workspaces thought to reflect architectural privacy.

Method

Participants—Thirty-six female clerical employees at a hospital were invited to participate; 30 took part (77 percent). None worked in a private office. Their job titles were clerk-typist, secretary, billing clerk, accounting clerk, and payroll clerk.

Setting—Most participants worked at desks in large, open areas containing support columns and office furniture and up to 19 people. Some participants worked at desks facing one other desk, screened on one side by thin partitions about 5 feet high. Several supervisors worked in offices with one or two glass walls, overlooking the employees.

Procedures—With the consent of the hospital administration, copies of the architect's drawing were obtained. Scale drawings of furniture were added. Direct measurements with a tape-measure were made during off-work hours, and the measurements were recorded in scale on the drawings. Participants received questionnaires at work and completed them on their own time, either during a break or at home the same evening. The questionnaires were collected at work, and any questions that arose were answered.

Measurements of Workspaces—Measurements of participants' workspaces refer to desks with the chair placed in roughly the same position as observed during the day: distance from nearest visible neighbor's desk, measured from the edge of the occupant's own desk; number of co-workers in the room besides the occupant; number of co-workers visible as the occupant worked; distance to nearest corridor or thoroughfare from the occupant's desk; and whether or not the occupant was visible to the supervisor from the supervisor's workspace.

Questionnaire—Questions consisted primarily of ratings on 7-step bipolar adjective scales. Questions asked for ratings of workspaces as comfortable—uncomfortable; colorful—drab; boring—interesting; old—new; attractive—unattractive; noisy—quiet; too far from co-workers—too close to co-workers; private—not private; and crowded—isolated.

Other items asked for estimates of time spent visiting with co-workers and talking to supervisors. Seven-step rating scales were included for ratings of distraction by co-workers (almost constantly—never); job satisfaction (highly dissatisfied—highly satisfied), and job performance (poor—excellent). The questionnaire also asked for written descriptions of the changes, if any, the participant would like in her workspace.

Results

The average participant worked in the same room with 11 other people but could see only 2.4 others at work. The average workspace was 3.3 feet from a corridor or thoroughfare and 4.0 feet from the nearest desk. About a third of the participants (30 percent) worked in areas visible from their supervisor's workspace.

Participants rated their workspaces comfortable ($\overline{X}=5.4$ on a 7-step scale), colorful ($\overline{X}=5.1$), new ($\overline{X}=5.4$), moderately attractive ($\overline{X}=4.7$), and neither interesting nor boring ($\overline{X}=4.2$). (These five adjectives were combined for analysis into a composite "pleasant place" variable.) Unlike the administrators in Study I, these people rated their work areas as not very private ($\overline{X}=2.3$), somewhat crowded ($\overline{X}=4.9$), and quite noisy ($\overline{X}=4.8$). On the average, participants saw their co-workers as a bit too close ($\overline{X}=4.8$) but not particularly distracting ($\overline{X}=4.0$). The questionnaire also asked for estimates of the amounts of time during the last workday the employee spent just visiting with co-workers and the time spent consulting with her supervisor. The average participant reported spending 36 minutes visiting (including breaks) and 17 minutes with her supervisor. On the average, participants reported that they were very satisfied with their jobs, ($\overline{X}=5.1$) and performed very well ($\overline{X}=5.6$).

As in Study I, correlation coefficients among variables describing features of the workspaces and responses to the questionnaire were calculated. They appear in Table 2. Despite the small sample, 18 of the 105 correlations proved statistically significant by two-tailed tests ($p<.05$). Five more predicted relationships were significant by one-tailed tests ($p<.05$). Multiple regression analyses were also employed, as in Study I.

Privacy—Having a large number of people in the same room was associated with lower ratings of privacy. Features of the workspace combined to predict 35 percent of the variance in privacy ($F=4.63$, $df=3,26$; $p<.05$).

Social Interaction, Noise, Distraction, and Crowding—Having a large number of people in a room was related to higher ratings of noise. Distance between workspaces was associated with lower ratings of noise. Areas far from corridors or thoroughfares received lower ratings on crowding. Reports of distractions were related to closer distance between workspaces, less privacy, and perceptions of co-workers as "too close." Privacy was unrelated to social interaction.

TABLE 2
Intercorrelation of Variables Measured Among 30 Female Clerical Employees

Variable	Variable (listed by numbers)													
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*Satis.*
Features of workspaces														
1. Distance from neighbor	—													
2. Number in room	-.72*	—												
3. Number/visible neighbors	.43*	-.22	—											
4. Visible to supervisor	.54*	-.46*	.72*	—										
5. Distance from corridor	.36*	-.88*	.08	.29	—									
Perceptions of workspaces														
6. Pleasant place	-.15	.11	-.07	-.09	.03	—								
7. Private	.28	-.34**	-.21	-.16	.21	.08	—							
8. Crowded	-.12	.30	.28	.20	-.47*	-.39*	-.25	—						
9. Noisy	-.49*	.34**	.12	.18	-.09	-.08	-.57*	.00	—					
10. Too close to co-workers	.00	.06	.18	.29	-.02	.07	-.36*	.38*	.25	—				
Perceptions of work														
11. Distracting co-workers	-.38*	.16	.04	-.09	.07	-.31	-.35**	.13	.53*	.35**	—			
12. Time just visiting	.18	.06	.34**	.31	.04	-.22	-.08	.24	-.21	.02	.01	—		
13. Time with supervisor	.24	.08	-.10	-.41*	.05	.14	.22	.06	-.19	.00	.03	.09	—	
Job-satisfaction	.13	-.24	-.14	-.24	.20	.30	.38*	-.15	-.20	-.18	.20	.28	.22	—
Job-performance (self-rated)	.34	-.40*	-.15	.11	.34	.10	-.27	.10	.27	.28	.20	-.15	.07	.12

*$p < .05$, two-tailed. Of 105 correlation coefficients calculated, 18 reached significance.
**$p < .05$, one-tailed, for predicted correlations.

Job Satisfaction and Performance—Even though their work was quite routine, participants expressed greater job satisfaction in areas they saw as relatively private. This contradicted the hypothesis. Similarly, self-ratings of performance showed an *inverse* relationship with number of persons in the room. Regression of job satisfaction on features of the workspace yielded an R^2 of .22 ($F=3.73$, $df=2,27$; $p<.05$). In predicting job performance from features of the workspace, only the "number in room" variable was retained in the stepwise procedure.

Analysis of Written Comments—To supplement the quantitative analyses, an analysis was made of written comments, which amounted to 33 separate remarks with as many as 3 per questionnaire. Of 30 participants, 21 wrote at least one comment. The most frequent comments consisted of complaints about the lack of privacy or partitions (36 percent). Next came complaints about lack of space (15 percent) and problems with heating and cooling (12 percent). Exactly half of the 30 participants wrote that they would like more partitions, more privacy, more space, or fewer people in the same room. These comments support the findings of the correlational analysis—that even people doing repetitive work are more satisfied in relatively private areas.

STUDY III

The third study included both clerical employees and people in complex jobs, in a wide range of workspaces. It employed a questionnaire and direct measurements of workspaces. The questionnaire contained items on the complexity of the job. It was predicted that people in administrative, supervisory, or technical jobs would give higher ratings. For the clerical employees, the study also included supervisors' ratings of performance.

Method

Participants and Setting—People who took part were 98 nonacademic employees of the University of Tennessee at Knoxville, including 32 in clerical positions, 14 secretaries, 21 in mechanical occupations (such as typewriter repair), 19 in technical occupations (such as purchasing agent or accountant), and 12 administrators and supervisors. All of the people asked to participate agreed to do so. The work environments ranged from plush private offices to desks in open areas in which up to 13 people worked. All workspaces were judged to be reasonably quiet and adequately illuminated, ventilated, and furnished.

Questionnaire—The questionnaire included the following 7-step ratings: comfortable—uncomfortable; colorful—drab; boring—interesting; old—new; poor light—adequate light; attractive—unattractive (these six formed a composite "pleasant place" variable). Other items on the workspace were: not private—private; crowded—isolated; noisy—quiet.

Items concerning the job asked for ratings on the following: complicated—simple; exciting—dull; requires little concentration—requires great concentration (these formed the composite "complex job"). Items about co-workers asked for ratings of distraction (never—almost constantly), the work-group (fragmented—cohesive) and the co-workers themselves (like very much—dislike). (These last two formed the composite "like co-workers.") Participants were asked to estimate the amount of time they spent consulting with their supervisor and visiting with co-workers. Separate items asked for ratings on 7-step scales of satisfaction with the workspace; job satisfaction; and job performance. In administering the questionnaire, each participant was given a copy at his or her workspace in the morning. The questionnaire was picked up later that day.

Measurements of Workspaces—Measurements with a measuring wheel (by Rolla-tape Corp.) were made in the mornings before workers arrived during the two weeks after the workers completed the questionnaires. The measurements, defined in Table 3, were recorded on floorplans of the work areas. The offices also were observed in operation to verify the identification of such features as common pathways, locations of employees as they worked, and visibility of workspaces to supervision.

TABLE 3
Definitions of Variables in Study III
Based on Physical Measurements of Workspaces

Variables	*Characteristics of Workspaces and Their Definitions*
Enclosed sides	Number of sides of workspace enclosed by wall or partition (0, 1, 2, 3, or 4)
Distance from neighbors[b]	Floorspace (in square feet) Distance[a] to the nearest adjacent workspace
Number of neighbors[b]	Number of workspaces in the room Number of workspaces visible during work Number of workspaces within 25 ft., walking distance[a] Number of workspaces within 50 ft., walking distance Number of workspaces accessible from the same common entrance
Distance from pathways[b]	Distance[a] to nearest common entrance Distance to nearest common pathway
Visible to supervisor	Workspace visible from supervisor's workspace (yes or no)

[a] Distances refer to chair-centers when chairs are placed as during work, measured to the nearest .5 ft. Distances between workspaces were measured only if they were not separated by walls or partitions.

[b] Composite variables.

Supervisors' Ratings of Job Performance—Ratings available from personnel records represented global evaluations on a scale of 1 to 5, with 5 as the best possible rating. (Ratings seldom fell below 3.0.) The ratings used were based on at least six months' work. Usable ratings were obtained for 45 of the 98 participants.

Results

Participants were divided into two groups: 67 in secretarial, clerical, or mechanical occupations and 31 in supervisory, administrative, or technical positions.

Results of the questionnaire (see Table 4) show that members of both groups rated their workspaces as pleasant places, somewhat crowded, not particularly private, somewhat noisy and distracting, but generally satisfactory. A multivariate analysis of variance showed that the ratings of the two groups differed ($F = 3.91$, $df = 11,67$; $p < .001$). Subsequent independent univariate tests revealed that the supervisory-administrative-technical group rated their jobs as more complex and their workspaces more private (61 percent had private offices, compared with 9 percent in the other group). They also reported greater job satisfaction.

TABLE 4
Average Responses to the Questionnaire by Two Occupational Groups in Study III, and Tests of Differences Between the Groups

	Average Response		
Variable	*Secretarial-Clerical-Mechanical Group*	*Supervisory-Administrative-Technical Group*	*Independent*[a] *Univariate F*
Crowded	4.8	4.7	.10
Privacy	2.7	3.8	5.23*
Pleasant place	4.7	5.1	2.16
Noisy	4.1	3.8	.70
Distractions	3.8	3.9	.13
Time with supervisor	40.4 min.	30.3 min.	.55
Visiting	37.1 min.	31.7 min.	.86
Liking for co-workers	5.6	5.7	.07
Complex job	4.6	5.9	23.37*
Satisfaction with workspace	4.6	5.0	1.12
Satisfaction with job	5.1	6.0	5.94*

[a] Using simultaneous, univariate F's (Krishnaiah, 1965), only complexity of job remains significant ($F = 2.32$, $df = 10,68$; $p < .05$).

*$p < .05$

To test the hypotheses, correlation coefficients were calculated separately for the two groups (see Table 5). Together the two matrices contain 256 correlation coefficients, of which 119 are significant at $p < .05$ with two-tailed tests. Again the correlation matrix was supplemented with stepwise multiple regression analyses.

Results for the Supervisory-Administrative-Technical Group

Privacy—Ratings of privacy in this group showed correlations with the number of enclosed sides, distance from co-workers, having fewer neighbors, and not being visible to the supervisor. These findings agreed with Hypothesis 1. Features of the workspace accounted for over half of the variance in ratings of privacy ($F = 10.04$, $df = 3,27$; $p < .05$; $R^2 = .53$).

TABLE 5
Correlations Among Variables Measured in the Two Occupational Groups[a]

Variables	Variable (listed by numbers)															
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*
Features of workspaces																
1. Number of enclosed sides		.08	-.76*	.15	-.58*	-.76*	.62*	.12	-.24	-.66*	-.16	-.46*	.21	.34*	.41*	.27
2. Distance to adjacent co-worker	-.06		-.15	-.11	-.43*	.00	.33*	.33*	.21	-.04	-.17	-.26	.10	.18	.31*	.06
3. Number of neighbors	-.46*	-.18		-.36*	.42*	.52*	-.34*	.23	.08	.38*	.06	.43*	-.22	-.06	-.13	.04
4. Distance to paths	.17	-.33*	-.09		.40*	.08	.08	-.38*	.04	.00	.35*	.31*	.22	-.21	-.25	-.52*
5. Visible to supervisor	.04	-.22*	.19	.19		.40*	-.43*	-.33*	.27	.43*	.19	.72*	-.11	-.46*	-.43*	-.52*
Perceptions of workspaces																
6. Crowded workspace	-.17	-.33*	.38*	.16	.27*		-.66*	-.36*	.35*	.64*	.08	.37*	-.24	-.18	-.60*	-.40*
7. Private workspace	.44*	-.15	-.25*	-.07	.00	-.36*		.55*	-.67*	-.72*	-.28	-.31*	.39*	.18	.72*	.32*
8. Pleasant place	.35*	-.03	-.08	-.01	.24*	-.15	.16		-.58*	-.41*	.00	-.11	.19	.24	.74*	.48*
9. Noisy	-.28*	-.11	.22*	.25*	.05	.37*	-.37*	-.27*		.55*	.22	.29*	-.18	-.07	-.53*	-.32*
Perceptions of work																
10. Distraction	-.27*	.01	.12	.20	.01	.35*	-.51*	-.27*	.43*		.25	.26	-.13	-.27	-.54*	-.29
11. Visiting	-.05	.57*	-.07	-.09	-.13	-.01	-.14	-.18	.08	.27*		.43*	.32*	.09	-.07	-.09
12. Time with supervisor	-.22*	-.21*	.09	.33*	.27*	.26*	-.19	-.27*	.36*	.28*	-.07		.20	-.01	-.18	-.27
13. Like co-workers	.15	-.10	.00	.02	-.14	-.06	.15	.25*	-.08	-.29*	.01	-.02		.39*	.51*	.41*
14. Complex job	.23*	.29*	-.04	.09	-.03	-.02	.00	.33*	.09	.22*	-.22*	.03	.29*		.28	.52*
Satisfaction and performance																
15. Satisfaction with workspace	.23*	.24*	-.11	-.04	.03	-.17	.26*	.51*	-.34*	-.06	.16	-.27	.31*	.14		.51*
16. Satisfaction with job	.06	-.20	-.01	.04	-.30	-.19	.38*	.28*	-.10	.21*	-.26*	.08	.30*	.50*	.30*	
17. Supervisor rating of performance	.33*	.27	-.43*	.02	.12	-.25	.22	.08	-.30*	-.22	.06	.00	-.17	.09	.37*	.12

[a]Entries are Pearson correlation coefficients for the variables in the corresponding row and column headings. The secretarial-clerical-mechanical group is represented in the lower left-hand triangle ($N = 67$); the supervisory-administrative-technical group appears in the upper right-hand triangle ($N = 31$); data for variable 17 were not sufficient. Underlined entries were significant in both groups.

*$p < .05$

Social Interaction, Noise, Crowding, and Distraction—Ratings of distraction were related to the number of neighbors, being visible to the supervisor, and having few sides of the workspace enclosed. (The same physical features were associated with ratings of crowding.) None of the physical features were related to noise, perhaps because the noise level was generally low. More social interaction in areas with little architectural privacy was expected, but this held only for interactions of employees with supervisors. Estimated time spent with the supervisor was highest in areas with fewer enclosed sides, visible from the supervisor's area, and with more neighbors.

Job Satisfaction and Performance—"Complex job" was correlated with the number of enclosed sides and inversely related to visibility to the supervisor. This suggests that management to some extent recognized a need for architectural privacy (or perhaps higher status) for complex tasks and assigned workspace accordingly. Job satisfaction was highly related to satisfaction with the workspace and was correlated with ratings of the workspace as private and not crowded. Two physical features were associated with job satisfaction: not being visible to the supervisor and being far from major pathways. (The most remote space was 98 feet walking distance from a main entrance and 21 feet from the nearest thoroughfare.) In the regression of job satisfaction on features of the workspace, these two physical features were retained. They combined to form a squared multiple correlation of .39 with job satisfaction ($F = 8.80$, $df = 2{,}28$; $p < .05$).

Results for the Secretarial-Clerical-Mechanical Group

Privacy—This group also gave higher ratings of privacy in areas with more enclosed sides and fewer neighbors. Of the features of the workspace entered as possible predictors in the stepwise regression procedure, only number of enclosed sides was retained ($F = 14.77$, $df = 1{,}63$; $p < .05$, $R^2 = .19$).

Social Interaction, Noise, Distraction, and Crowding—Ratings of crowding were higher in areas with a relatively large number of neighbors, areas visible to the supervisors, and areas distant from neighbors. Ratings of noise were higher in areas with fewer enclosed sides and more co-workers. However, less noise was reported in workspaces close to paths. Predictions on social interaction again held only for interactions with supervisors. Estimates of time spent with the supervisor were associated with fewer enclosed sides, being visible to the supervisor, being closer to neighbors, and being further from pathways. Interaction with supervisors apparently occurred most in the larger, nonprivate areas containing many workers. Reported time spent visiting with co-workers was associated with distance from neighbors and also with distraction and low ratings on complex job.

Job Satisfaction and Performance—Job satisfaction was associated with satisfaction with workspace, but not as strongly as in the other group. Job satisfaction was associated with not being visible to the supervisor and with ratings of workspaces as private. Features of the workspace predicted supervisors' ratings of performance rather well—$R^2 = .29$ ($F = 6.29$, $df = 2{,}31$; $p < .05$). But, contrary to the hypothesis, these ratings of performance showed a positive correlation with the number of sides of the workspace enclosed and a negative correlation with the number of neighbors (-.43). These findings do not support the hypothesis, but they agree with Study II.

It was speculated that some of the clerical jobs may have been too complex to show the predicted pattern. Therefore, the secretarial-clerical-mechanical group was split at the median of the "complex job" variable and the correlation matrix for each subgroup was calculated. The two matrixes were essentially the same and for all practical purposes repeated what appears in Table 4. This analysis of the 33 people with the lowest ratings of job-complexity leaves little doubt of the positive relationship of privacy with satisfaction and performance even in the least complicated jobs, at least for this sample.

DISCUSSION AND CONCLUSIONS

All three studies showed that architectural privacy—as embodied in places with physical means of visual and acoustic isolation—was consistently associated with psychological privacy. Even in relatively accessible places, privacy was related to the amount of enclosure and the number of people in the vicinity. This finding supports the hypothesized connection of architectural and psychological privacy.

Also consistent with predictions, all three studies found that people who rated their workspaces as private—and people with architectural privacy—tended to report less noise, distraction, and crowding than did those in less private places. This agrees with predictions. However, practically no relationship at all was found between architectural accessibility and social interaction among co-workers. Physical accessibility was associated only with more contact with supervisors, which might be due to the types of jobs assigned to visible areas. The lack of a relationship between physical accessibility and social contact among co-workers appears inconsistent with earlier research on companies that moved to open plan offices. In these studies, accessibility fostered interaction among workers, at least for a while after a move (see Sundstrom & Sundstrom, 1981, for a review). The present study, however, examined people who had typically worked in the same place for more than six months. Perhaps moving into an open plan office creates increased interaction only for a short period, and people soon revert to earlier habits of interaction as they adapt to the less private conditions and develop ways of regulating social contact.

The lack of an association between architectural privacy and interaction among co-workers carries an important implication. Employees apparently achieved the interaction they desired in spite of the architecture. This agrees with the idea that people actively maintain what for them is a desirable level of social contact (Sundstrom, 1977; Sundstrom & Sundstrom, 1981). But these results go squarely against the idea of architectural determinism. Perhaps workspaces have more influence on distraction by co-workers than visiting among them.

Predictions concerning job satisfaction held that people with complicated jobs would be most satisfied in private spaces, but people with more routine jobs would be most satisfied in nonprivate arrangements. One of the main findings was that for all three studies, and for all types of jobs studied, *participants generally preferred privacy* over accessibility. One obvious explanation concerns the noise and distraction experienced in nonprivate places. Participants apparently liked quiet workspaces where neighboring co-workers were relatively few and far away. This fits with the concept of overload (Cohen, 1978)—workers in private spaces can control their exposure to sources of overload. Participants also liked their places enclosed and visually inaccessible, which suggests that they prefer areas in which they perhaps can tend less to maintaining appearances and more to getting the job done. Both explanations agree with earlier concepts of privacy (Altman, 1975; Westin, 1970). Another explanation concerns the symbolic value of privacy (Steele, 1973). People may prefer private workspaces because they often signify status or importance. Physical distinctions based on status seem to pervade most organizations, especially such things as floorspace, size and quality of desk, and amount and quality of incidental furniture (Steele, 1973; Sundstrom & Sundstrom, 1981). Private offices usually go to the highest ranking members of an organization. The more closely a person's space resembles a private office, the more it could represent a sign of status, both to the occupant and to co-workers.

Theories of privacy suggest that one of its major functions is to serve the individual's self-identity by creating personal boundaries (Altman, 1975; Westin, 1970). Visual and acoustic isolation might contribute by allowing the individual to act "out of role" occasionally or to discuss personal topics in confidence, and thus maintain psychological boundaries. The status-expressive aspect of privacy also may contribute to self identity. The initial conception of privacy used here—in terms of control over social contact, noise, and distraction—may have overemphasized the concept of an optimal level of social contact and underemphasized the link of privacy with identity.

Results gave a limited indication of a positive correlation of privacy and performance, even among people with the least complex jobs. (Correlations emerged between performance ratings and having more enclosed sides and few neighbors.) This disconfirms the predictions, which grew out of the social facilitation hypothesis. Perhaps the noise and distractions in nonprivate areas were intense enough to disrupt clerical and secretarial work. It was reasoned that people in repetitive jobs would be stimulated to perform better in nonprivate areas. But apparently they were not. On the other hand, it is possible that supervisors routinely assigned their best performing people to the most private places, although most supervisors did not have the authority. But an incidental finding casts doubt on this idea. In this sample of employees a negative correlation was found between supervisors' ratings of performance and the presence of a window within 10 feet of the workspace ($r = -.42$; $p < .05$). About half of the participants worked near a window. It seemed unlikely that supervisors rewarded employees by placing them in areas without windows. Another explanation is based on equity theory (Berkowitz, 1976), which suggests that workspaces operate as a kind of incentive. Those who occupy desirable workspaces might feel a sense of inequity unless they perform their jobs well (Burt & Sundstrom, 1979). However, whether those in relatively private workspaces performed better because of the lack of noise and distraction, or to avoid feelings of inequity, or for some other reason, privacy may represent an important influence on performance.

The present findings, although consistent across three separate studies, have obvious limitations. The research is purely correlational, so the interpretations must remain tentative until tested in experiments. The samples were small (85, 30, and 98), though they contained people with diverse job titles, and the measure of job performance did leave something to be desired.

Keeping in mind these limitations, however, the findings may carry practical implications. The first concerns the design of offices. If the findings generalize, employees in a variety of jobs may prefer more privacy than was afforded by many of the workspaces found in this study. This could explain why so many of the companies that have introduced open plan offices have had complaints from employees (see "The Trouble," 1978). Many open plan offices lack the features that this study found related to workers' satisfaction with their spaces, especially features that limit visibility and audibility, such as partitions and buffer zones. The findings suggest that existing open plan offices may need more provisions for privacy to achieve maximal satisfaction, such as room dividers, sound-absorbent partitions, and acoustically treated ceilings or walls (Hansen, 1974; Sabine, 1973). Although some open plan offices do include such features (Pile, 1978), many could include more.

In conclusion, the three studies showed an association between architectural and psychological privacy and found both types of privacy related to satisfaction with workspaces and job satisfaction. This held for all types of jobs studied, including secretarial and clerical. The results might stem partly from freedom from distractions in private places, partly from the capacity of private spaces to signify status, and partly from the link of privacy with self-identity. In any case, privacy at work remains an important issue with practical implications for design and management of physical environments.

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Perceptual Measures of Task Characteristics: The Biasing Effects of Differing Frames of Reference and Job Attitudes

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The study reported here examines the extent to which variations in the perceptions of job characteristics may be associated, not with objective task characteristics, but with perceptual biases reflecting individuals' frames of reference and general job attitudes. The results show that perceptual assessments of task characteristics, vary with the individual's frame of reference and job attitudes.

In the past ten years, a substantial amount of research has been concerned with the impact of task characteristics on job satisfaction and performance (Hackman & Oldham, 1976; Hackman & Lawler, 1971; Pierce & Dunham, 1976; Turner and Lawrence, 1965). This outpouring of research generally has emphasized the importance of job design as a determinant of job satisfaction, for example, Robey (1974). Recent investigations of this genre also have focused on various moderators of the job design–job satisfaction relationship. A large number of these studies examined some form of "higher ordered need strength," such as need for achievement or growth, as the moderators (Giles, 1977; Hackman & Oldham, 1976; Sims, Szilagyi, & Keller, 1976; Steers & Spencer, 1977; Wanous, 1974). A smaller number of studies examined other moderators, such as departmental membership, position in the organization, and functional specialty (Dunham, 1977; Herman & Hulin, 1972; O'Reilly & Roberts, 1975).

More recently, however, a number of criticisms have been made of the job design literature—criticisms that raise questions about the validity of previous findings. First, almost the entire body of research focuses on five core job characteristics: skill variety, task identity, autonomy, task significance, and feedback. These task dimensions almost always are measured using perceptual assessments of the job incumbents (Hackman & Lawler, 1971; Hackman & Oldham, 1975; Sims, et al., 1976). Thus, although Turner and Lawrence (1965) began their Requisite Task Analysis with objective assessments of task characteristics, little further attention has been paid to (a) whether the five task dimensions assessed are relevant or important to particular job holders or (b) whether the perceptions by job incumbents of task characteristics might be biased (O'Reilly, 1977). Instead, instrument development attempts have relied on factor analytic results and correlations with other perceptual measures to demonstrate instrument validity (Hackman & Oldham, 1975; Sims et al., 1976). Yet, questions have been raised about the nature of the dimensionality underlying the measurement of job dimensions (Dunham, 1976; Dunham, Aldag, & Brief, 1977).

A second, more fundamental, criticism questions the extent to which individuals have stable needs (Salancik & Pfeffer, 1977; 1978). Rather than job satisfaction being contingent on a match between job characteristics and one's needs, individuals may define task characteristics and respond affectively based on the saliency and consistency of environmental cues. From this perspective, definitions of task characteristics and job satisfaction are determined primarily by the job incumbent's perceptions of cues that focus attention on certain characteristics of the job and determine appropriate affective responses. Individuals performing unskilled assembly line tasks may focus, not on the lack of autonomy and skill variety provided by the job, but on the opportunity for social interaction and high wages (Roy, 1960; Strauss, 1974). O'Reilly and Caldwell (1979), in a laboratory study using an enriched and an unenriched task, found that perceptions of task characteristics (e.g., variety, autonomy, feedback) were primarily a function of informational cues, not objective aspects of the job. In a job enrichment field experiment, King (1974) found that expectations about the job, not objective job characteristics, were the primary determinants of both job satisfaction and performance. These studies point out the susceptibility of perceptual assessments of job dimensions to the saliency of informational cues. They also suggest the importance of examining the extent to which task characteristics lead to variations in job attitudes or the degree to which one's affective state results in differential perceptions of job dimensions. In addition these studies raise questions, not addressed in this investigation, about the use of only five task characteristics to represent the domain of job dimensions.

The use of questionnaire measures of job characteristics increases the likelihood of individuals redefining objectively similar task characteristics in different ways. This redefinition may stem from a variety of causes. One's frame of reference, as represented by factors such as past experiences, present roles, and socialized expectations, may result in different perceptions and definitions of the same job. For example, workers who have been on the job longer or who have more tenure with the organization may alter the job based on past experience (O'Reilly, 1977).

Workers with comparatively more education, those from differing backgrounds or with different aspirations, or those with different reference groups, such as union members, also may see the same task differently (Adams, 1965; England & Stein, 1961; Klein & Maher, 1966; O'Reilly, 1977). Job holders who volunteer for a job or who are wealthier may see less extrinsic justification for working and perceive the same job differently than those who had little choice in taking the job or who work for less money (Deci, 1971; Pfeffer & Lawler, 1980; Salancik, 1977). Clearly, the frame of reference one brings to the job and the informational and normative cues one receives while working may result in differential perceptions of objectively identical task characteristics.

This concern with the perceptual measurement of task dimensions is important because the accretion of research about job design relies largely on perceptual measures. Although Hackman and Oldham (1976) suggested that individual differences might influence workers' perceptions of task characteristics as well as responses to variations in job design, most studies of job design-job satisfaction links and individual moderators typically use information gathered only from the job incumbent, maximizing the opportunity for response-response bias and perceptual redefinition of job characteristics.

Based on evidence about the importance of frame of reference and informational influence (O'Reilly & Caldwell, 1979; Pincus & Waters, 1977; Salancik & Pfeffer, 1977, 1978) as determinants of questionnaire responses, the present study investigates sources of systematic variations in perceptions of task characteristics by employees holding identical jobs. The general hypothesis is that *variance in task characteristics assessed by the Job Diagnostic Survey (JDS), a perceptual measure* (Hackman & Oldham, 1975), *will vary according to an individual's frame of reference (e.g., tenure, education, background, income, race, etc.), definition of the job (in this sample, attitudes defining what professionalism means to the respondent), and general job satisfaction (e.g., satisfaction with the work itself, co-workers, and supervisor).* The argument is that these factors will lead to individual variations in the perceptions of skill variety, task identity, autonomy, task significance, and feedback, although all respondents hold identical jobs. Further, the argument is made here that one's general affective response to the job results in differential perceptions of task characteristics, not the opposite.

METHOD

Subjects—As a part of a larger study, responses were obtained from 98 county public health nurses (PHNs). For the purpose of this study, only those PHNs in the same job classification were selected ($N = 76$). These respondents filled positions with a single job description, performed the same tasks, had the same specialized training required for certification, and had very comparable clients and case loads. The sample was organized into 11 geographically separate units.

Interviews with PHNs and management confirmed that the sample of public health nurses chosen did, in fact, perform basically the same set of tasks. Management, for example, indicated that the two-page job description for this set of PHNs carefully stipulated, based on state law, the qualifications required to fill the position as well as the range of duties performed. These required tasks included supervising families in home medical care (e.g., geriatric, stroke recovery, diabetes), handling referrals and appointments to clinics, assisting in the administration of public health programs (e.g., tuberculosis, venereal disease [VD] prevention), and providing educational assistance to clients. PHNs typically were transferred every two years, with no differentiations made by management among PHN jobs. All PHNs, once employed by the county, were presumed to be interchangeable with respect to the skills required and tasks performed.

Discussions with PHNs confirmed management's perceptions. Although nurses indicated that some variations might exist with respect to the type of clients served, all PHNs within the job classification invariably performed all the duties described in the job description. For example, although nurses in some locations might have proportionately more geriatric and VD cases, all would perform a highly similar set of tasks. These variations were not reported to alter significantly the job requirements. Overall, there was agreement among the PHNs sampled that all were performing the same job.

In order to verify the objective similarity among jobs, a job analysis using expert judges also was conducted. A recent task analysis developed by the State Conference of Health Department Nursing Directors for the job of public health nurses was obtained. This task analysis was predicated on the numerous state codes that define the duties of PHNs and consisted of an inventory of 49 tasks that entry level PHNs could be expected to perform. For example, tasks included eliciting health histories, recognizing abnormal gastrointestinal symptoms, using demographic and biostatistical data, and developing patient care plans. These 49 statements were used as a job inventory (McCormick, 1976). Seven of the 11 supervisors in the county were interviewed and asked to indicate whether the nurses in their particular unit had performed each of the tasks in the last three months and, if so, what percentage of the unit. Results showed that 42 out of the 49 tasks were accomplished in all units. Three other tasks were completed in six of the seven units, and three others completed in five of the seven. One task (visual inspection of the endocrine system) was completed in only four of the seven units. In almost every instance, supervisors indicated that if the task had been accomplished within the previous three months, all PHNs in the unit had performed that task. An examination of the reported frequencies with which tasks were accomplished revealed that over 70 percent of the 49 tasks were performed at least weekly by all subjects. Several tasks, common to all PHNs, were performed only on a monthly or bimonthly basis. These results appear to substantiate the consensus among nurses and management that all respondents in this study were performing highly similar tasks.

Measures—To assess the impact of frame of reference on perceptions of job characteristics, information was obtained about the respondents' age, educational level, tenure with the county, tenure in the work unit, total annual family income (the sum of one's salary plus any other income), whether the respondent was the sole support, whether the respondent was a member of a union, and father's and mother's education. Table 1 presents these figures for the sample of 76 PHNs used here.

TABLE 1
Sample Characteristics ($N = 76$)

Variable	*Value*
1. Tenure with the county	6.8 Years (median)
2. Tenure with the work unit	12.4 Months (median)
3. Education	91% Bachelor's degree 9% Master's degree
4. Age	32-35 Years (median)
5. Race (1 = minority, 2 = nonminority)	36% Minority 64% Nonminority
6. Union membership (1 = yes, 2 = no)	47% Union member 53% Nonunion
7. Sole support (1 = yes, 2 = no)	43% Sole support 57% Other support available
8. Total income	$20,000-30,000 (median)
9. Father's education	60% 12 years or less 31% Some college or college degree 9% Graduate work
10. Mother's education	62% 12 years or less 32% Some college or college degree 6% Graduate work

Differences in attitudes about professionalism were obtained using 3-item indexes from a scale originally developed by Hall (1968). Three items with the highest factor loadings were selected for each of the five dimensions from the results presented by Snizek (1972). The dimensions tapped were: (1) use of the professional organization as a major referent (e.g., "I regularly attend professional meetings at the local level"); (2) a belief in public service (e.g., "I think that my profession, more than any other, is essential for society"); (3) a belief in self-regulation (e.g., "My colleagues pretty well know how well we all do our work"); (4) a sense of calling to the field (e.g., "The dedication of people in this field is most gratifying"); and (5) a belief in job autonomy (e.g., "I am my own boss in almost every work-related situation").

General satisfaction with the job was assessed by asking respondents to indicate on a 5-point scale how satisfied they were with the work itself, coworkers and supervision. These items were summed to form an index of general job satisfaction (Cronbach $\alpha = .67$).

In addition to job satisfaction, respondents also indicated on a 5-point scale the extent to which they planned to remain with the county for the next three years. This index, developed by Kraut (1975), has been shown to be predictive of actual turnover. In the present study it is used as an indicator of the extent to which respondents are temporally committed to the job.

Task characteristics assessed were those measured by the Job Diagnostic Survey (JDS): skill variety, task identity, autonomy, task significance, and feedback (Hackman & Oldham, 1975). In addition to these five dimensions, an overall Motivating Potential Score (MPS) was calculated according to the formula recommended by Hackman and Oldham (1976).

Analysis—To test for systematic variations in perceptions of task characteristics attributable to individual variations in frame of reference, definition of the professional job, and overall affect, a hierarchical regression procedure was used. Regressions were computed with each of the five task characteristics assessed by the JDS and the overall MPS as dependent variables. Use of this analytic technique allows for control of variations in the dependent measures (JDS) associated with frame of reference and professionalism prior to examining the impact of job affect and commitment.

With this method, 10 frame of reference variables are entered into the equation in the first stage. This ensures that variations in perceptions attributable to these factors are controlled for. In the second stage, the five professionalism variables are entered to account for perceptual variations due to different definitions of professionalism. Finally, in the third stage, overall job satisfaction and future tenure plans are entered to assess variations in the dependent variable due to affect and temporal commitment.

With the staged regression technique, the relative contribution to the variance accounted for by each variable set can be observed by changes in the adjusted R^2. Thus, a large increase in the variance explained by the addition of the satisfaction variable, after the frame of reference and professionalism sets, can be seen as the unique variance accounted for by that variable.

RESULTS

Based on previous studies that have demonstrated variations in the underlying factor structure for the JDS, a principal components analysis with an oblimax rotation was computed using the 15 JDS items to ascertain the dimensionality for the JDS for this sample (Dunham, 1976; Dunham et al., 1977). Results showed a five factor solution which would be categorized as "marginal" by Dunham et al. (1977); that is, clean loadings were obtained for the feedback, task identity, and autonomy dimensions with cross-loadings between skill variety and task significance. Based on these findings and those reported by Dunham et al. (1977), a decision was made to use all five of the JDS dimensions in subsequent analyses, acknowledging that there may be some redundancy between the skill variety and task significance components.

Variations in the perceptions of task characteristics are evident from the correlations presented in Table 2. Variables indicative of different frames of reference from which job incumbents may view the same job in different ways suggest that workers who are older, have greater total income, longer tenure in the unit, have fathers with higher education, and have higher education themselves, see the job of public health nurse differently than do workers nearer the other ends of these dimensions. For example, older nurses describe the job as having more skill variety and task significance than do younger nurses. Nurses who have been in a unit longer see more task identity in their jobs than do newcomers.

TABLE 2
Correlations Among Task Characteristics and Frame of Reference, Professionalism, and Affective Orientation Toward the Job ($N=76$)

	JDS Task Characteristics					
	Skill Variety	*Task Identity*	*Autonomy*	*Feedback*	*Task Significance*	*Motivating Potential Score*
1. Tenure—county	-.00	.09	-.08	.17	-.05	.08
2. Tenure—unit	.15	.26**	.06	.18	.04	.20*
3. Education	.06	-.21*	-.15	.02	-.04	-.09
4. Age	.21*	.06	-.09	.15	.21*	.12
5. Race	.03	-.01	.16	-.09	-.02	.01
6. Union membership	-.10	.09	-.02	.00	-.08	-.01
7. Sole support	.08	.06	.13	-.17	.15	.00
8. Total income	.22**	.23**	.13	-.01	.05	.11
9. Father's education	-.04	-.21*	-.08	-.18	-.10	-.23**
10. Mother's education	-.01	-.11	.04	-.07	-.01	-.08
11. Professional group as a major referent	.22**	.24**	.21*	.29***	.31***	.38***
12. Belief in public service	-.03	.08	-.06	.14	.06	.09
13. Belief in self-regulation	-.18	-.36***	-.19*	-.25**	-.26**	-.38***
14. Sense of calling to the field	.35***	.26**	.09	.23**	.49***	.31***
15. Belief in job autonomy	.03	.16	.29***	-.03	.01	.17
16. Estimate of future tenure with county	.31***	.27**	.16	.40***	.38***	.41***
17. Overall job satisfaction	.33***	.23**	.39***	.46***	.33***	.52***

*$p < .10$
**$p < .05$
***$p < .01$ (two-tailed test)

Clear variations in perceptions of task characteristics are associated with the different views of professionalism held by job incumbents. Recall that all jobs are the same and variations are associated with individuals' varying perspectives of what the profession of nursing means to them. Nurses who identify strongly with the major professional organization, evince a sense of calling to the field, and who do not believe strongly in self-regulation report their jobs as higher on almost all task dimensions than do those who are less committed to the professional group, see nursing less as a vocational calling, and believe in self-regulation. PHNs who believe in job autonomy also perceive the job as offering more of it than do those who do not.

Differences in professionalism among PHNs also are evident, with younger nurses who evince stronger beliefs in self-regulation also rejecting the national professional organization and the vocational aspects of nursing presented as a calling to the field. These differences are discussed in detail elsewhere (O'Reilly, Bloom, & Parlette, 1977).

Finally, strong associations are shown between temporal commitment to the job and overall job satisfaction and perceptions of task characteristics. Respondents who are satisfied and intend to remain with the county perceive the same job as offering more variety, identity, feedback, and significance. The MPS, which is an index of the extent to which the job is enriched, is correlated strongly with both the affective orientations and professionalism views of the job holders. This suggests either (a) the identical job differs widely resulting in these relationships or (b) those who are satisfied and hold a particular view of the profession describe the same job differently.

To examine the aggregated and unique effects of frame of reference, professional attitudes, and affective orientation on perceptions of task dimensions, a series of hierarchical regressions was run with the five task characteristics and overall MPS as dependent variables. Results are shown in Table 3.

TABLE 3
Incremental Additions to Explained Variance from Frame of Reference, Professionalism and Affective Orientation

	Change in Adjusted $\bar{R}^2$ Due to:				
Dependent Variable	*Frame of Reference*	*Professional Attitudes*	*Affective Orientation*	*Total Adjusted R^2*	*Overall F-Ratio*
1. Skill variety	.01	.05	.11	.17	1.89*
2. Task identity	.13	.09	.02	.24	2.38**
3. Autonomy	.00	.04	.15	.19	2.04*
4. Feedback	.02	.11	.17	.30	2.88**
5. Task significance	.00	.24	.06	.30	2.85**
6. Motivating potential score	.02	.21	.22	.45	4.51**

*$p<.05$
**$p<.01$

The hierarchical regression technique enters each set of variables in a stepwise fashion. This allows an estimate of the unique addition to explained variance to be obtained by observing the incremental difference in the adjusted $\bar{R}^2$ after a set of variables has been entered into the equation. The changes in adjusted $\bar{R}^2$ reported in Table 3 provide estimates of the variance explained attributable to individual differences in perceptions of the same job associated with variations in one's frame of reference, professional attitudes, and affective set toward the job. A summary of these effects can be seen in the impact of individual differences on the MPS. A total (adjusted $\bar{R}^2$) of 45 percent of the variance is explained. The largest impact of frame of reference is seen on perceptions of task identity. Professional attitudes have the largest effect on perceptions of task significance. General affective orientation has substantial impacts on perceptions of autonomy and feedback.

To examine better the independent effects of specific variables, standardized regression coefficients for the six regression equations are presented in Table 4. Recall that significant betas indicate a nonrandom relationship between the independent and dependent variables controlling for the impact of all other variables in the equation.

TABLE 4
Standardized Regression Coefficients (Betas)

	Dependent Variables					
Independent Variables	*Skill Variety*	*Task Identity*	*Autonomy*	*Feedback*	*Task Significance*	*Motivating Potential Score (MPS)*
Frame of reference						
Tenure with the county	−.26	.10	.03	.18	−.26	.05
Tenure with the unit	.11	.13	.00	.10	−.10	.06
Education	.13	−.18	.05	.07	.04	.04
Age	.19	−.13	−.29	−.09	.26	−.08
Race (1 = nonwhite, 2 = white)	.09	−.12	.24	.02	.04	.08
Union member (1 = yes, 2 = no)	−.13	.17	−.06	.04	.04	.05
Sole support (1 = yes, 2 = no)	−.05	−.14	.07	−.26*	.07	−.14
Total income	.22	.29*	.16	.12	−.06	.17
Father's education	−.02	−.25	−.25	−.30	−.04	−.33*
Mother's education	−.08	.01	.08	.10	−.07	.06
Professionalism						
Professional group as a major referent	.07	.16	.20	.18	.20	.28*
Belief in public service	−.12	−.11	−.18	.03	−.14	−.11
Belief in self-regulation	−.07	−.27*	−.01	−.14	−.18	−.24*
Sense of calling to the field	.20	.09	−.03	.09	.35**	.09
Belief in job autonomy	−.05	.04	.21	−.11	−.07	.05
Affective orientation						
Future tenure	.13	.19	.08	.22	.21	.24
Overall job satisfaction	.30*	.06	.37**	.30*	.13	.33**
F-Ratio	1.89*	2.38**	2.04*	2.88**	2.85**	4.51**
Adjusted R^2	.17	.24	.19	.30	.30	.45

*$p < .05$
**$p < .01$

Overall job satisfaction is significantly related to perceptions of increased skill variety, autonomy, feedback, and the MPS for the job. It should be reemphasized that this relationship occurs for job incumbents describing identical jobs and only *after* controlling for a variety of individual differences, such as age, tenure, education, and professionalism.

Other frame of reference and profesionalism variables also are associated with perceptions of task characteristics. A larger total family income and a comparatively weaker belief in self-regulation are associated with heightened perceptions of task identity. Nurses who provide sole support to themselves or their families and who express greater job satisfaction perceive more feedback from the job. Public health nurses for whom professionalism is expressed more in terms of a sense of calling to the field perceive more task significance in their work than do those who do not. Overall, a higher MPS for the job is given by nurses whose fathers have less formal education and for whom professionalism is characterized by the use of the professional association as a major referent and a diminished belief in the importance of self-regulation. A higher MPS also is associated with higher job satisfaction scores.

DISCUSSION

The motivating hypothesis underlying this study was an examination of the extent to which reported variations in task dimensions obtained from perceptual assessments might be the result of variations, not of objective task characteristics, but in variables reflecting differences in job incumbents' frames of reference for viewing the job and attitudes about the work. Although the data used in this study are cross-sectional and causality cannot be inferred, an initial test was made by examining variations in the perceptual assessments of task characteristics made by a sample of respondents all holding the same job. A set of variables that could result in either objective or perceptual redefinition of the identical job was then examined. The results presented here demonstrate that some variations in perceptions of task characteristics are associated with varying frames of reference about the job. For example, nurses whose fathers had less formal education described their job as more enriched than did nurses with more highly educated fathers. Two alternative explanations for these findings can be offered. Either objective variations in the task lead to variations in individual characteristics, or these individual characteristics result in systematic biases in perceptions of task characteristics. Because it is unlikely that variations in age or father's education are the result of differing task characteristics, the latter explanation is seen as more plausible.

Second, because all respondents were professionals, relationships among attitudes toward the profession and task characteristics were examined. The results reveal a number of significant relationships. Table 3, for example, shows that the professionalism variables explain 24 percent of the variation in assessments of task significance. Again, two explanations for these associations can be offered. Either task characteristics result in variations in attitudes such as a belief in self-regulation or a sense of calling to the field, or differences in professionalism result in differential perceptions of job characteristics. If professionalism reflects a set of norms inculcated through a process of socialization and training (Hall, 1968), then the more likely explanation is that different conceptions of professionalism result in differential assessments of task characteristics, not the opposite.

Finally, after controlling for frame of reference and professionalism variables, relationships among task dimensions and job satisfaction and intent to remain in the job were examined. Again, two rival plausible hypotheses can be considered. Previous research on job design attributed causality to relationships observed between certain job characteristics and satisfaction, with variations in task design seen as resulting in workers' satisfaction (Hulin & Blood, 1968; Turner & Lawrence, 1965). However, the opposite or reciprocal effects may be occurring, with satisfied workers describing their jobs in more positive and socially desirable terms. In the present study, given that the job is the same with all PHNs providing the same service delivery to clients, and given that those frame of reference and professionalism variables that might account for objective or perceptual redefinitions of the job have been controlled for, it is argued that one's general satisfaction is more likely to result in differential assessments of job characteristics than the opposite. Rather than differences in job design leading to differences in satisfaction, those job occupants who are comparatively more satisfied with the identical job are seen as responding more positively, indicating that their jobs are more motivating, have more autonomy, require more skill variety, and provide more feedback.

In this regard, it is noted that the strongest overall relationships (Table 3) are found with the least "objective" task dimensions, i.e., task identity, feedback, and task significance. These dimensions may be the most susceptible to the perceptual distortion investigated here. However, one's affective orientation accounts for substantial variation in perceptions of the skill variety and autonomy present in the job after controlling for both frame of reference and professionalism variables. Thus, the variance in task characteristics accounted for by overall job satisfaction is seen as the result of a favorable response set.

The argument being made here is not that jobs do not have objective characteristics. Clearly, jobs often require different skills and abilities. Keypunching and assembly line tasks may easily provide objectively for less autonomy and skill variety than do the jobs of attorneys and physicians. Similarly, the argument is not that perceptual measures cannot be used to assess task characteristics. A number of task instruments such as that of McCormick (1976) have been developed using questionnaires. Turner and Lawrence (1965) and Hackman and Lawler (1971) began their instrument development being careful to obtain objective measures to corroborate the perceptual ones.

What is being argued here is that legitimate questions exist about the degree to which perceptual assessments of job characteristics may reflect variations in different perceptions of the same job and a general affective set about the work. Conceptually, it is reasonable that individuals may respond differentially to the same stimulus (e.g., task characteristic) depending on factors such as background, experience, expectations, or mood. The results of this study may be interpreted in this way.

The argument that perceptual assessments may be biased is hardly new or original. Unfortunately, while acknowledging the weaknesses of questionnaire measures, researchers typically have continued to rely on them. Yet, a body of research exists demonstrating that the measures may be seriously affected by group pressures (Kiesler & Kiesler, 1969), role occupancy (Lieberman, 1956; Zucker, 1977), informational influence (O'Reilly & Caldwell, 1979; Pincus & Waters, 1977), and a variety of response artifacts such as consistency and halo (Salancik & Pfeffer, 1977, 1978).

The results of the present study are seen as consistent with this evidence. What is of potential importance here is the amount of systematic variance in perceptually measured job characteristics associated with nonjob-centered variables. The results of this study raise questions about the utility of perceptual measures of task design, the causality between job design and job satisfaction, and the extent to which present knowledge of these relationships, based as it is on primarily perceptual, cross-sectional studies, is valid.

It should be noted, however, that although the results of a task analysis indicated that the jobs performed by subjects in this study were almost identical, the position of a public health nurse is a complex job and differences in specifics of tasks may yet remain. A more rigorous test of the biasing effects reported here, using incumbents of even more similar jobs (e.g., keypunchers), should be conducted before any final conclusions are drawn.

Given the small sample size and cross-sectional nature of the study, the findings reported here must be seen as tentative. The results, however, are consistent with the social construction of task characteristics proposed by Salancik and Pfeffer (1978). Individuals in the present study appear to perceive similar task dimensions differently. Importantly, these systematic differences appear to stem, in part, from the job holders' overall satisfaction with the job, resulting in more satisfied workers reporting the task as being more motivating. If this consistency bias generalizes, it may be that findings from previous job design research reflect, not the impact of objective task characteristics, but more satisfied workers reporting their jobs to possess more desirable attributes.

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An Analysis of the Relative Job Progression of the Perceptibly Physically Handicapped[1]

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This research supports the conclusion that the effects of handicap-based social-psychological factors can be moderated by a supportive vocational environment to the extent that most perceptibly physically handicapped will perform over a career as well as the nonhandicapped. Eight different measures of performance were analyzed.

Better utilization of the nation's handicapped is a major social and economic problem. Thousands of physically handicapped are jobless. Many become embittered because of the lack of opportunity often caused by discrimination in hiring and on the job. This discrimination results to a great extent from a lack of knowledge about the handicapped as workers. According to the 1970 census, over 11 million Americans age 16 to 64 were classified as handicapped. The handicapped population has contended with less income, employment, and education than have the nondisabled. Only 42 percent of the adult handicapped were employed, contrasted with 59 percent of the total adult population (President's Committee on Employment of the Handicapped, 1975).

The President's Committee on the Employment of the Physically Handicapped (1956) believed that the greatest problem to overcome is the tremendous lack of understanding among employers. Two basic reasons for the failure of employers to hire more of the physically handicapped are prejudice and a lack of knowledge about the employment of handicapped workers.

One reason for hesitation by many employers and managers in employing the handicapped may be the dearth of information on the career

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experiences of the physically handicapped. No significant research has been found dealing with how well the physically handicapped employee performs over a span of years and jobs; that is, how he compares in career behavior and progression with the nonhandicapped.

There are many studies on vocational rehabilitation, the social and psychological aspects of disability, prejudice towards the handicapped, and initial job experience. Many studies have compared the handicapped worker with the nonhandicapped. However, these studies: (1) did not compare behavior on a career basis; (2) failed to consider the organizational environment with respect to the degree that the handicapped employees were treated differently; (3) were concerned predominately with blue-collar jobs or did not differentiate between jobs requiring physical skills and those that do not; (4) were primarily concerned with the initial job; (5) dealt summarily with the classification of the handicaps and did not compare the effectiveness of persons with specific types of impairment; (6) mostly employed opinions of supervisors and others and therefore were subject to biasing errors; and (7) were negligent in considering the effects of variables such as sex, race, educational level, age, and type of work.

Before hiring handicapped workers, employers are concerned with: (1) whether there will be additional costs such as adapting plant and equipment, insurance, safety, and training and (2) how well the handicapped will "fit in" and perform over an extended period of time in their firm and its environment. There are many encouraging examples and answers to the first question, but not the second. The primary objective of the present research was to determine how well the physically handicapped would perform over a career and compare with the nonhandicapped under equivalent circumstances.

Recognized handicap-based factors that may limit or affect the vocational opportunity or behavior of the perceptibly physically handicapped may be classified into three basic categories: (1) Physical factors: (a) physical ability or skill restrictions, (b) safety requirements, (c) travel requirements, and (d) access to facilities or job areas; (2) Institutional factors such as: (a) costs to adapt plant and equipment, (b) additional costs for recruiting, selecting and training, and (c) effects, if any, on insurance or employee benefits; and (3) Social-psychological factors, which include characteristics found by research to be present to a greater or lesser degree in the personalities of the perceptibly physically handicapped than in the nonhandicapped. Social aspects include bias, prejudice, stigma, or differential attitudes toward the physically handicapped, including empathy, by employers, managers, peers, and customers.

A research environment was needed that would minimize the effects of the handicap-based factors cited above. Selection of the federal civil service as an area for analysis was natural for several reasons. First, General Schedule (GS) civil service vocational careers such as clerks, administrative technicians, managers, and other white-collar workers require few or no physical skills. Thus, the effects of the physical factors described above were virtually eliminated. Second, institutional factors were not a detriment using the civil service environment. Most importantly, the research environment was found to be a supportive climate for all employees. A major premise of the study was that a supportive environment would minimize the effects of the third category above, the handicap-based social-psychological factors.

The federal government has long set an example in the employment and treatment of handicapped persons. Federal jobs have been opened to more than a quarter of a million handicapped persons since World War II (Obermann, 1965; Malikin & Rusalem, 1973). The term "equal employment opportunities" as applied by civil service and the Air Force to the research population during the study period means equal opportunities to compete for placement, career status, and promotion on the basis of qualification (United States Air Force, 1973).

The Air Force Logistics Command, the source of the data, had an outstanding record in this regard. Despite a civilian population of almost 86,000, including over 8,000 handicapped employees, no evidence was found that there had been any formal employee grievances in which handicap was a factor during the last five years. There were no grievances by handicapped persons concerning their opportunities, and no reverse discrimination grievances (Trainer, 1977). This is significant evidence of the supportive nature of the research environment.

Minimization of the physical and institutional factors allowed the testing of the premise that a supportive environment would moderate the effects of handicap-based social-psychological factors. Specifically, the question to be answered was: To what extent can a work environment designed to "normalize" the opportunities of the handicapped alleviate the effects of handicap-based social and psychological factors? That is, to what extent can it aid in personal and social adjustment to physical disability?

THE STUDY

The methodology of this study centered around the comparison of performance of the perceptibly physically handicapped with that of the nonhandicapped. More formally, the basic null hypothesis tested in this study was:

> *Given careers not requiring physical skills, and in a vocational environment and sociological climate in which the handicapped have the same relative opportunities as nonhandicapped employees for career progression and self-actualization, there would be no significant differences between the two groups.*

This hypothesis was tested using the following eight conventional measures of vocational behavior: 1. promotion rate, 2. performance rating, 3. salary attained, 4. awards rate, 5. suggestions approved rate, 6. formal education self-advancement rate, 7. sick leave rate, and 8. tenure. The hypothesis was tested comparing the following categories of perceptibly physical handicap with the nonhandicapped: 1) orthopedic handicap; 2) visual handicap; 3) audiological and/or speech handicap. Only personnel who had physical impairments that were evident or perceptible to other persons on a continuing basis were included in the handicapped category.

A promotion was defined as any elevation to a higher grade, and the promotion rate was calculated by dividing the number of promotions by tenure in years. This measure excluded step pay increases due to longevity. Skipping one or more grades constituted one promotion. Bases for promotion in civil service include achievement, experience, and education. Competition for promotion is strong because there is civil service wide competitive placement.

The Air Force rating system instituted in 1974 placed primary focus on responsibility and initiative. The Supervisory Appraisal of Employee Current Performance (SAECP) was the rating instrument. The question, "How much supervision would I have to give this employee if I assigned him a task requiring...?" was asked about a series of task elements such as "attention to details and close accuracy" or "combining information from various sources to solve problems." Ratings from "A—almost no supervision required" to "G—constant supervision..." were given for each relevant element. To make the task elements better fit the type, level, and scope of vocational positions, there were six variations of the SAECP: clerical, GS supervision, scientist and engineer, operations analyst, nonsupervisory GS, and middle and high management. An average score based on the ratings given on relevant elements was obtained and assigned to each of the nonrated elements. In the Air Force Logistics Command an overall numerical score (zero to 100) was computed and recorded in the employee's file. These are the scores that were used.

The salary attained variable was the annual salary achieved by survey ending date. Comparisons were made on a years-of-tenure basis.

The award rate was computed by dividing the number of awards by civil service tenure years. Over 40 different types of awards were included. However, the awards may have ranged from the Presidential Award for Distinguished Federal Civil Service to the one year Safe Driver Award. No attempt was made to quantify the qualitative differences in the awards.

The suggestions approved rate was the number of suggestions approved in terms of cash awards and/or formal recognition during the employee's civil service career. The rate was computed by dividing the number of suggestions approved by tenure in years.

The formal education self-advancement rate was computed by subtracting the level of education held by the employee at civil service entry from the level reached by study completion date and dividing the result by tenure in years. Consolidations were made to fit terminal occupation programs, associate degrees, professional degrees, and six-year degrees into a hierarchy of equivalent progress. Educational levels used were: (1) some elementary school, (2) completed elementary school, (3) some high school, (4) completed high school, (5) less than one year of college, (6), (7), (8), (9) one, two, three, four years of college, respectively, (10) bachelor degree, (11) post-bachelor work, (12) master's degree, (13) post-master's work, and (14) doctorate degree.

The sick leave credit rate variable was computed by dividing the credit hours accumulated by the tenure of the individual in years. In federal civil service sick leave credit accrues at the rate of 104 hours per year. Finally, tenure was measured as years of service.

The awards rate variable, the suggestions approved rate, and the formal education self-advancement rate by their nature are subject to scale unit bias. However, the large number of subjects involved should have increased the degree of homogeneity between the comparison groups with respect to the distribution of these variables. There was a common denominator in each of these variables for comparative purposes: each award, suggestion approved, or step up the educational ladder represented accomplishment and recognition beyond that normally expected.

THE RESEARCH SUBJECTS

The research subjects were all career status General Schedule civil service employees of the United States Air Force Logistics Command (AFLC) and were located in five industrial depots plus a command headquarters/base complex. These were:

1. Headquarters, Air Force Logistics Command and Wright-Patterson Air Force Base, Dayton, Ohio;
2. Ogden Air Logistics Center, Ogden, Utah;
3. Oklahoma City Air Logistics Center, Oklahoma City, Oklahoma;
4. Sacramento Air Logistics Center, Sacramento, California;
5. San Antonio Air Logistics Center, San Antonio, Texas; and
6. Warner Robins Air Logistics Center, Warner Robins, Georgia.

The AFLC's mission is the logistical support of Air Force components and missions: procurement, supply, transportation, maintenance, logistical control, and administration. The wide geographical distribution of the six sites of the research population provides less probability of location bias with respect to projecting the findings to other United States vocational populations. The entire population of 808 perceptibly physically handicapped male Caucasian personnel of the above organization was compared with a stratified random sample control group drawn from each of the six study locations in numbers equal to the handicapped at each location.

The homogeneity of the comparison groups, except for handicap, was of prime importance. The variables age, entry educational level, entry category, and tenure were used to measure the degree of homogeneity between the two groups. The study was limited to male Caucasians in order to increase significantly the comparability of the two groups by avoiding the confounding effect of sex and race. The large number of subjects also allows comparison of the handicapped and the nonhandicapped on a years of service basis. Additionally, the data gathered were limited to employees with a federal civil service career appointment that requires a three year probationary period. This factor assured a meaningful period of employment for comparison purposes and further enhanced the homogeneity of the two groups. The very large sample size should have minimized sample variations. Despite the large size of the population groups, the nonsampling error should be small because of the exceptional controls that were exercised over the coding, processing, and other administration of these critical data derived from the personnel records of the individuals.

A comparison of the educational level of the subjects at the time of civil service entry reveals a reasonably close parallel. The following distribution showing the percent in each education level (handicapped in parentheses) was found: 1. no high school diploma—13.7 percent (18.1 percent); 2. high school diploma only—38.1 percent (36.0 percent); 3. less than two years' college—19.2 percent (24.8 percent); 4. over two years' college, no degree—7.9 percent (5.9 percent); 5. bachelor degree—18.9 percent (12.1 percent); 6. graduate work, no degree—1.1 percent (.9 percent); 7. graduate degree—1.5 percent (1.6 percent). Overall, the nonhandicapped had a slightly higher level of education. In terms of the 14 levels mentioned earlier, the nonhandicapped averaged 5.656 levels and the handicapped 5.274 levels.

THE DATA AND RESULTS

Three Air Force personnel data systems provided the research data: the Civilian Personnel Management Information System (CPMIS), and the Air Force Logistics Command's E 246 system and Payroll system. The CPMIS and its prototype, the E 246 system, are both computerized files of civilian personnel records (Trainer, 1977).

At the time of survey end, the AFLC had a total civil service population of 85,960. Of these, 25,825 were General Schedule, career status, male Caucasians, of which 808 were perceptibly physically handicapped. After excluding 1,759 employees having handicaps other than categories researched, a control group of 808 nonhandicapped employees was stratified by location and randomly selected from the remaining 23,258. The sample of the nonhandicapped was 3.7 percent.

In compliance with Air Force restrictions, each of the research subjects was given a code number to prohibit his identification by social security number, name, or base location. The numbers of handicapped and of nonhandicapped taken from the six bases respectively were 227, 161, 129, 109, 101, and 81. The mean entry age was 28.82 years for the nonhandicapped groups and 29.08 for the handicapped groups. The mean years of tenure was 18.49 for the nonhandicapped and 19.51 for the handicapped.

An interesting aspect of entry status is that most of the employees, both handicapped and nonhandicapped, began their civil service careers in a category other than General Schedule. The Wage Grade, Wage Leader, and Wage Supervisor categories are paid on an hourly basis, and the employees may best be described as blue-collar workers and foremen.

The statistic, eta squared (correlation ratio) (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975), was used to measure the association between the number of persons of handicapped status versus the number of persons of nonhandicapped status, by years of tenure. Eta squared was .00427, indicating no evidence that any pattern of hiring or retention existed.

Table 1 gives a summary of the data findings for seven of the eight measuring instruments. The other instrument, tenure, was used to create a cross-section for further analysis.

TABLE 1
Summary of Data Findings

	Average Number of Promotions Per Year	*Average Supervisory Appraisal Score*	*Average Salary Attained in Thousands*
Total nonhandicapped	.251	93.38	18.597
Total handicapped	.247 (−.004)	92.77 (−.61)	17.197 (−1.400)*
Orthopedic	.247 (−.004)	92.67 (−.71)	16.832 (−1.765)*
Visual	.248 (−.003)	93.96 (+.58)	17.665 (−.932)
Hearing/speech	.246 (−.005)	91.25 (−2.13)	18.279 (−.318)

	Average Number of Awards Per Year	*Average Number of Suggestions Approved Per Year*	*Average Number of Levels of Formal Education Advanced Per Year*
Total nonhandicapped	.065	.051	.038
Total handicapped	.051 (−.014)*	.060 (+.009)	.039 (+.001)
Orthopedic	.050 (−.015)*	.056 (+.005)	.039 (+.001)
Visual	.054 (−.011)	.074 (+.023)*	.037 (−.001)
Hearing/speech	.052 (−.013)	.054 (+.003)	.041 (+.003)

	Average Number of Hours of Sick Leave Used Per Year
Total nonhandicapped	50.94
Total handicapped	62.40 (+11.46)*
Orthopedic	66.61 (+15.67)*
Visual	53.67 (+2.73)
Hearing/speech	56.96 (+6.02)

( ) indicates difference of handicapped category minus nonhandicapped.

* indicates difference between total nonhandicapped and handicapped group is significant at the 1 percent level or lower.

The nonhandicapped averaged slightly more promotions per year (.251 to .247) than the handicapped, had slightly higher supervisory ratings (93.38 to 92.77), substantially more salary ($18,597 to $17,197), and a higher award rate (.065 to .051). On the other hand, the handicapped had a higher number of suggestions approved (.060 to .051) and just slightly more levels of educational advancement (.039 to .038). The handicapped, as might be expected, used more sick leave time by 11.46 hours (1.4 days) per year (62.40 hours to 50.94 hours). Table 1 shows the averages for the three handicapped categories.

Although a general similarity exists among the handicapped groups, several differences are worth noting. The visually handicapped received the highest average performance rating, exceeding the nonhandicapped and showing a considerably higher rating than the hearing and speech handicapped. Oddly, this latter group had the highest average salary of the three handicapped groups. This is not accounted for by tenure. The visual group had a slightly higher average tenure (20.49 to 20.26 years). In fact, the only factor that would appear to justify this salary position is educational advancement, in which the hearing and speech handicapped exceeded all the other groups including the nonhandicapped.

The visually handicapped had substantially more suggestions approved per year than did the other handicapped groups. Finally, most of the difference between the handicapped and the nonhandicapped in sick leave taken is accounted for by the orthopedically handicapped.

In determining whether these differences between the handicapped and nonhandicapped are significant or just happenstance, the level of significance chosen must bear careful consideration. Because of the large size of the samples and the very low control conditions, statistical significance was defined for the group comparisons as occurring when alpha is less than .01. This is in consonance with Labovitz's (1968) criteria for selecting levels of significance.

A *t* test of the difference in means was conducted for a comparison between the nonhandicapped and the handicapped as a whole and by the three groups. The figures with an asterisk in Table 1 were significantly different from the nonhandicapped at the 1 percent level or less. The statistically significant differences found in the group data were:

1. The average salary of the nonhandicapped significantly exceeded that of the orthopedically handicapped to the extent that the total handicapped salary was also significantly different.
2. The average number of awards per year of the nonhandicapped significantly exceeded that of the orthopedically handicapped to the extent that the total handicapped group was also significantly lower.
3. The visually handicapped had a significantly higher number of suggestions approved than the nonhandicapped.
4. The orthopedically handicapped had a significantly higher rate of sick leave used per year than the nonhandicapped to the extent that the total handicapped difference was also significant.
5. Not shown in Table 1, but also calculated was a significant difference in tenure. The mean years of tenure of the total handicapped, 19.51, exceeded significantly that of the nonhandicapped, 18.49.

However, with the large number of observations in the grouped data, the significance is relatively easy to find. A more valid and valuable comparison was made of 31 tenure groups by years of service. This provided a direct career progression comparison for all of the performance measures except tenure, which allowed cross-sectioning of the data, and the supervisory appraisal score, which was not available on a time series basis. Only the last performance rating, through December 1975, was available.

The salient findings of the tenure group comparisons were:

1) Regarding promotion, there was no significant difference between the handicapped and nonhandicapped in any of the 31 tenure groups. If there was any pattern at all of note, it was that for the lower years of service, the handicapped did slightly better; for the higher years of service, the nonhandicapped did slightly better.
2) Seven of the tenure groups showed the nonhandicapped with significantly higher salaries than the handicapped. However, what may be more important was that the mean salary, whether significant or not, was higher for the nonhandicapped in 27 of the 31 groups.
3) The mean number of awards earned showed significant differences at 10 percent in only four cases. However, 23 cases exhibited a higher mean for the nonhandicapped. Again, this advantage appeared stronger in the tenure years above 20. Below 20 years' tenure, the differences were mixed. This result, coupled with the first finding above, could indicate a more positive attitude toward the handicapped in the past 15 to 20 years.
4) Only one significant difference, at 5 percent, was found in the 31 tenure groups for mean suggestions approved. In 19 of the 31 year groups, a higher mean number of suggestions approved was achieved by the handicapped.
5) Comparison by tenure groups of the mean levels of formal education advancement showed only five differences significant at 10 percent and only one of these significant at 5 percent and none at 1 percent. This measure gave no indication of true differences in educational advancement.
6) A comparison of the means of sick leave credit accrued in days yielded the greatest differences between the handicapped and nonhandicapped. For all the groups except two, the nonhandicapped accrued sick leave credit at a greater rate than did the physically handicapped. For 14 of these groups the difference was significant at 10 percent, with 9 of the 14 significant at 5 percent, and 4 of the 14 at 1 percent.

The analysis by type of handicap showed that the orthopedic group, with 531 subjects and 15½ more hours of sick leave used per year than the nonimpaired, heavily affected the comparisons using total handicapped. Although 8.3 days of sick leave used per year by the orthopedically handicapped would be considered low in many business firms, the difference when compared to the nonhandicapped group's 6.4 days yielded a significance level below .001. The frequency and time required to adjust prosthetic devices is probably one factor in the difference. No significant differences were found in sick leave used when the group of visually impaired persons and the group with audiological/speech handicaps were compared with the nonhandicapped.

One added comparison is worthy of mention. The handicapped's longer mean tenure, 19.51 to 18.49 years for the nonhandicapped, means that the handicapped group had a lower employee turnover rate, which reduces personnel costs of recruiting, selecting, and training.

SUMMARY AND CONCLUSION

This study was designed to test the hypothesis that: given a vocational environment and sociological climate in which the perceptibly physically handicapped have the same opportunities for career progression and self-actualization as do nonimpaired employees, there would be few differences between the two groups in career progression and contribution. For the subjects with visual and hearing/speech handicaps, and to a lesser degree for the orthopedically handicapped, the research results support the research hypothesis.

Significant differences between the nonhandicapped and the handicapped were found for the performance measures of salary, awards per year, tenure, and sick leave used. However, with the exception of tenure, analysis by handicapped groupings showed that these differences resulted largely from significant differences between the orthopedically handicapped and the nonhandicapped. The orthopedic group made up approximately 66 percent of the handicapped group. Also, the visually handicapped had a significantly higher number of suggestions approved per year than did the nonhandicapped group.

When analyzed by tenure group, only the salary and sick leave used measures showed any substantial biases, with the nonhandicapped generally having higher salary (27 of 31 groups) and the handicapped using more sick leave (29 of 31 groups). Again, the sick leave differential is due largely to the orthopedically handicapped group. However, in the majority of these cases, the differences were not statistically significant. For salary, only 7 of the 31 groups showed the higher average of the nonhandicapped as significant at 10 percent or below. For sick leave, the higher use by the handicapped was significant at 10 percent or below in four of the groups.

However, the weight of the results showing the 27 groups of nonhandicapped with higher salaries and 29 of the handicapped groups with higher sick leave use must be considered a significant finding. This fact is reflected in the significance for the groups as a whole in these areas.

Clearly, because of the nature of this study, the differences must be examined from a practical view as well as from a statistically significant view. The difference in mean salary attained of $1,765 between the orthopedically handicapped and the nonimpaired is both statistically and practically significant. Some possible reasons for this are discussed below.

However, the other three statistically significant differences found between the groups do not appear quite as significant when viewed in a practical context. For example, the visually handicapped exceeded the nonhandicapped by a statistically significant difference in suggestions approved, yet the difference equates to less than one additional suggestion approved in a 43-year career. Also, the difference between the nonhandicapped and the orthopedically impaired in average number of awards per year (.065 versus .050) means that for every 66.7 years of tenure the nonhandicapped group achieved one more award than did the orthopedically impaired.

Regarding the significant salary difference between the orthopedically handicapped and the nonimpaired, only speculative reasons may be advanced (name identification and interviewing of the subjects were not permitted). The slightly lower educational level of the handicapped probably contributed somewhat. However, the research on the psychological and sociological aspects of the perceptibly physically handicapped coupled with the research design suggests that prejudice or discrimination may have been a factor. This discrimination, if it exists, may have been exercised by nonimpaired supervisors in the selection-for-promotion process, particularly for higher level General Schedule grades. Promotion decisions and judgments on how well a person meets the more general and complex qualifications for higher grades make it more difficult to detect prejudice than do decisions on lower level grade promotions. The possibility exists that the large amount of travel required by many of the higher level General Schedule positions in the Air Force Logistics Command could offer nonimpaired managers a basis for rationalizing prejudices. Also, certain of the orthopedically handicapped may not have sought jobs involving travel, particularly in the early study years before some of the improvements in travel access. The degree of perceptibility of orthopedic handicaps versus the other handicaps studied also may have been a factor. The above suggestions, although not supported by data, are based on an extensive knowledge of the research population and their environment.

Finally, there is no reason why the findings of this study with respect to the relationship of a supportive vocational environment to the comparative performance of the perceptibly physically handicapped cannot be generalized to other types of vocational populations. The basis for this is strengthened by the homogeneity of the compared groups, the geographic distribution of the samples, and the wide spectrum of administrative and logistical jobs held by the subjects. Hopefully, this research will provide a more objective basis for decisions regarding the career employment of physically disabled persons.

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Research Notes

SEX DIFFERENCES IN OCCUPATIONAL ASPIRATIONS[1]

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Recent concern with employment discrimination and the tendency of many higher level occupations to remain sexually or racially segregated has caused a renewed interest in career choice. It is well known that females have tended to choose occupations different from those chosen by males and that they have encountered barriers to entry and advancement in "male occupations." Obstacles to female advancement in nontraditional areas have been summarized elsewhere (Terborg, 1977). The options open to women have been limited both by lower aspirations than men (Epstein & Bronzaft, 1974) and by external occupational restrictions (O'Leary, 1974).

The present study focuses on the occupational aspirations of a recent sample of high school seniors in order to provide a comparative analysis of male and female aspirations. The findings allow estimates of the degree to which female aspirations may have changed as a result of changing social norms and values, i.e., the women's movement. They also provide insight into the extent to which occupational segregation by sex is likely to persist and the extent to which such segregation may be due to internal as opposed to external forces.

One may question the degree to which the initial aspirations of high school seniors correlate with their eventual career. A recent study of this issue by Copes (1975) found significant differences between the original occupational aspirations of high school seniors and their eventual careers. However, most of the changes represented a lowering of aspiration level toward more realistic goals. Few of those with lower aspirations eventually entered or aspired to higher level occupations. It also has been found in two other studies (Barnett & Tagiuri, 1973; Miner & Smith, 1969) that a low level of aspiration toward managerial careers is associated with the eventual choice of a nonmanagerial career. Thus, it appears that aspiration toward higher level occupations is a *necessary*, though not sufficient, prerequisite for entry into these occupations.

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Method

Fourteen high schools in the state of Alabama were selected for this study on the basis of their size (number of students), location (urban, suburban, or rural), and racial composition (percent nonwhite). The object was to develop a representative sample of high school seniors in the state. The mean size of the senior class in these 14 schools was 220. An average of 26 percent of the student body was nonwhite. Of the 14 schools, 43 percent were located in Standard Metropolitan Statistical areas (SMSAs), urban and suburban; 57 percent were located in rural areas. However, because the SMSA schools were larger, they represented 58 percent of the students surveyed. These data indicate that the sample is representative of all high schools in Alabama. However, in comparison with the national averages, the average high school in Alabama is smaller and has an overrepresentation of nonwhites and students from rural backgrounds. Questionnaires were sent to the schools and completed during the third week of November 1977. All 3,053 seniors in the 14 schools were to be surveyed. However, due to absenteeism and failure to complete the questionnaire properly, a final sample of 2,112 usable questionnaires was obtained (69.2 percent). A breakdown of respondent characteristics showed an average age of 17.4, 54.3 percent females, 26.4 percent nonwhites, and 50.8 percent enrolled in a college preparatory program. In addition, 26.7 percent indicated that their father's occupation was professional or managerial. Although these data appear to be representative of high school seniors both in Alabama and in the nation as a whole, it is still possible that the values and aspirations of high school seniors in Alabama are somehow different from those in other states. Consequently, the results should be interpreted with caution.

The dependent variable in the study is occupational aspirations. This is measured by the student's response to the following question: "What occupation are you now most interested in?" The responses were divided into the following eight categories of occupations as specified by the U.S. Bureau of Labor Statistics: professional and technical, manager, sales, clerical, crafts, operative, service worker, or laborer. The major independent variable is sex. A descriptive table indicates the numbers and percentages of the sample aspiring to the various occupations. These data are broken down by sex and the differences in proportions of males and females aspiring to each are calculated.

Results

Table 1 shows the occupational aspirations of Alabama high school seniors in the sample. Approximately 82 percent aspired to a particular occupation. The other 18 percent were uncertain what they wanted to do when they completed their education. In light of the present distribution of the U.S. work force, these aspirations appear somewhat unrealistic

(U.S. President, 1977). In particular, there is an underrepresentation of those aspiring to be managers, salespersons, and service workers together and an overrepresentation of those aspiring to professional and technical occupations. Realistically, many of those who aspire to enter professional and technical occupations eventually will assume managerial or sales positions that may or may not be related to the original occupational choice. For example, an individual aspiring to become an engineer may eventually receive an engineering degree and then enter a sales or managerial position with a technically oriented organization. Several studies indicate that such adjustments do, in fact, occur in the post-high school years (Copes, 1975; Grasso & Kohen, 1977).

TABLE 1

Occupational Aspirations of 2,122 Alabama High School Seniors, 1977

Occupational Category	*All Respondents*		*Percentage of Respondents Who Have Made a Choice*			
	Number	*Percent*	*Total (n = 1,725)*	*Male Respondents (n = 763)*	*Female Respondents (n = 962)*	*T*
1. Managerial	70	3.3	4.1	5.6	2.8	3.89*
2. Professional and technical	970	45.9	56.2	54.5	57.6	1.29
3. Sales	35	1.7	2.0	2.1	2.0	.15
4. Clerical	244	11.6	14.2	.8	24.8	14.20*
5. Crafts	228	10.8	13.2	24.7	4.2	12.50*
6. Operative	68	3.2	3.9	7.7	.9	7.23*
7. Laborer	15	.7	.9	1.8	.0	3.91*
8. Service	95	4.5	5.5	2.8	7.7	4.41*
Subtotals	1,725	81.7	100.0	100.0	100.0	
9. "Don't know," uncertain	387	18.3				
Totals	2,112	100.0				

*$p < .001$

A comparison of the career aspirations of males and females indicates that occupational segregation by sex is likely to continue in the future. Approximately twice as high a percentage of males (5.6 percent) as females (2.8 percent) aspired to a managerial position. This result is compatible with findings of several earlier studies (Barnett & Tagiuri, 1973; McCall & Lawler, 1976; Miner & Smith, 1969). However, these data do not indicate that female occupational aspirations are *lower* than those of the males. They are merely different, with females aspiring to professional and technical occupations to a slightly greater degree than the males, but aspiring to managerial occupations to a lesser degree. Overall, 60.4 percent of the females and 60.1 percent of the males aspired to *either* a professional *or* a managerial position. Beyond these two higher level occupational categories, aspiration follows along the traditional lines of occupational segregation. Females aspire to clerical and service positions, and males aspire to be craftsmen, operatives, or laborers. All of these differences are statistically significant at the .001 level or more. Professional and sales were the only two occupational groupings for which there were not statistically significant differences in the proportion of male and female aspirations.

Discussion

The socialization process for young people in the United States today apparently encourages aspiration toward professional careers but not toward managerial careers. It also tends to reinforce existing sex role stereotypes concerning various occupational groupings.

Few high school students of either sex aspire to managerial careers. Although the reported data do not allow a definitive conclusion as to why this situation exists, some tentative explanations are possible. Information for high school students concerning managerial careers may be lacking or inaccurate. Most of the information on managerial careers available to the public is garnered from the mass media through radio, television, and popularized books and magazines (Barnett & Tagiuri, 1973). Individuals providing such information often have little background or information and may present a distorted or unrealistic picture of the managerial role (Braunstein & Haines, 1971). Because managerial functions are at least as important as are professional functions for the survival of our society, the business community should make a greater effort to increase information concerning (and esteem for) management careers.

It also has been noted elsewhere (Miner, 1977) that the "motivation to manage" among students of all ages is low and declining. A survey of high school students indicated that those intending to go to college held an executive career in low regard, although reactions to other careers in business organizations of a more professional nature (such as law or research) were more positive (Braunstein & Haines, 1971). Miner predicts that if the current trend continues, there will not be a sufficient number of *competent* and *effective* managers in the years ahead to maintain current organizational forms, let alone to staff additional growth (Miner, 1974, 1977). The reasons for a declining motivation to management among young people are not clear, but they undoubtedly reflect the cultural norms and values of society. Yet, previous research indicates that it *is* possible to improve the motivation to management among young people through training (Bowin, 1973). Perhaps it also is possible to change attitudes, perceptions, and aspirations toward management careers through other change strategies.

Finally, students may perceive managerial role requirements to be incompatible with the "feminine role" (O'Leary, 1974; Shinar, 1975). Neither the present study nor an earlier study by Goodale and Hall (1976) found females to have lower occupational aspirations than males in general. The present study found no significant differences in male and female aspirations toward higher level positions (managerial and professional combined). Although on an absolute basis the difference in managerial aspirations of males and females appears small (2.8 percent), such a difference is statistically significant due to the large sample size. Female aspiration toward *management* remains significantly lower than that of males.

The reasons for continued sexual segregation by occupation are many and complex. Among the most important are those factors that affect the initial aspirations of females, including the cultural values of the society (Psathas, 1968; Tipton, 1976), the cultural values of the family (Hall, 1976); feminine role perceptions (Crawford, 1978), the potential impact of a demanding career on family life (McClure & Piel, 1978), role conflict (Hall, 1972), lack of role models (McClure & Piel, 1978), discouragement from high school guidance counselors (Ahrons, 1976), lack of self-confidence (Maccoby & Jacklin, 1974; Lenny, 1977), and "fear of success" (Horner, 1972). The relative importance of these various factors is unclear. More in-depth case studies are necessary. The issue is important because continued occupational segregation will mean continued underutilization of the female labor force. In the case of managerial occupations, given the recent unprecedented growth in business school enrollment, there will not be an absolute shortage of managers. But the average level of quality and competence of these managers may be less than it would be if females aspired to managerial careers in the same proportion as males.

The results of this study indicate that at a time when external barriers to women are being cast aside through legislation and vocal disavowal of sex-role stereotypes in some quarters, there apparently are deep-rooted attitudes that continue to direct both sexes toward traditional occupational roles. Simply removing external discriminatory barriers to female equality alone is insufficient to insure such equality. Because aspirations appear to be a necessary prerequisite to higher level occupational achievement, more needs to be done to stimulate the aspirations of young women toward non-traditional, male-dominated occupations such as management.

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A COMPARISON OF LEVELS OF JOB SATISFACTION, ROLE STRESS, AND PERSONAL COMPETENCE BETWEEN UNION MEMBERS AND NONMEMBERS[1]

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Conventional industrial relations wisdom traditionally has linked unionization with employee dissatisfaction. The literature has long posited economic and job related problems as prime sources of worker-union attachment. For example, Bakke (1945) identified individual goals which when unfulfilled may lead to unionization. Sometime later Seidman, London, and Karsh (1957), in a study of a United Steelworkers of America Local union, found strong evidence that many workers had unionized as a reaction to management's treatment of them as individual employees. Such generalizations as these may be found throughout the existing literature (Form & Dansereau, 1957; Spinrod, 1960).

Recently some researchers have been able to provide empirical support for the hypothesized link between job satisfaction and unionization. Bigoness (1978), for example, found that employee attitudes toward unionism were negatively related to job satisfaction. Alutto and Belasco (1974) found pro-union attitudes to be positively associated with job tension.

Other studies have reported that employees who voted for unions in representation elections tended to have lower levels of job satisfaction (Getman & Goldberg, 1976; Getman, Goldberg, & Herman, 1972; Schriesheim, 1978). Hamner and Smith (1978) also have had modest success in predicting the level of unionization among organizational units with employee attitudinal measures.

Another recent study explored personality correlates of pro-union attitudes. In this study (Cangemic, Clark, & Harryman, 1976), the researchers found pro-union employees to score lower than pro-company employees on personality assessments of achievement and endurance and higher than pro-company employees on the need for succor.

Subsequently, the stereotype of the pro-union employee appears to be one who is dissatisfied with his/her job; one who is experiencing role stress at work; and one who possesses relatively low levels of self-esteem.

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The present study attempts to move to the next level in the analysis of the unionization-employee attitude relationship. That is, do union members, in comparison with nonmembers, report lower levels of job satisfaction and self-esteem and higher levels of job stress?

Data from a recent study on union decertification elections indicate that there might be growing dissatisfaction among union members. According to Fulmer:

> Not only have unions won only one half of recent organizing elections, but also they are facing more decertification efforts than ever before. In 1977 employees at approximately 1794 work places formally attempted to oust their union representatives—a 188% increase in ten years. Of the 1794 petitions, approximately 800 resulted in decertifications —a 242% increase in ten years (1978, p. 164).

If this rise in decertification elections is symptomatic of union members' unfulfilled expectations, then union members should *continue* to possess more negative job attitudes in comparison to nonmembers. The purpose of the present study was to test this supposition. Specifically, the following research hypotheses were tested:

Hypothesis 1. Union members experience lower levels of job satisfaction than do nonmembers.

Hypothesis 2. Union members experience higher levels of job stress than do nonmembers.

Hypothesis 3. Union members have lower levels of personal competence than do nonmembers.

Method

Sample—The data for this research were obtained from 178 aides (nonprofessional, direct care personnel) from three residential mental health facilities located in a southern state. Of these aides, 102 were members of a union affiliated with the AFL-CIO. The data in Table 1 indicate that the union members had less formal education and more position and organizational tenure than did the nonmembers.

The health facilities provided comparable services to the residents in their care and had the same distribution of job classifications and compensation levels under the state merit system. Chi square analysis indicated that the sample proportions of union members in the aide classification at the facilities were equally distributed. The proportions of union members based on the total population of aides in each of the three facilities also were equally distributed (i.e., 57.6 percent, 50.3 percent, and 52.8 percent).

No formal, enabling state legislation with respect to public employee unions existed, and there was no formal collective bargaining agreement between the mental health agency and the union under study. However, there was an operating grievance procedure with arbitration as the final step, and agency management and union leadership did meet to discuss terms and conditions of employment.

TABLE 1
Demographic Characteristics of Respondents

	Union Members (Percent)	*Nonunion Members (Percent)*	*Significance of Chi Square*
Age: 20-25	32	48	$p<.20$
26-30	38	29	
31-40	14	11	
41-50	13	7	
Over 50	3	5	
Sex: Male	28	33	$p<.53$
Female	72	67	
Education: High school not completed	6	0	$p<.04$
High school graduate	83	80	
Associate degree	9	12	
Bachelor's degree	2	8	
Position tenure: Less than one year	20	38	$p<.02$
One to five years	68	47	
Over five years	12	15	
Organization tenure: Less than one year	10	29	$p<.01$
One to five years	70	57	
Over five years	20	14	

Procedures and Measures—Small groups of aides (approximately 20 persons) met with the researchers in a room that had been designed for data collection at each of the three facilities. Participants were informed that the survey would be anonymous. After explaining the instructions and answering questions from respondents, the researchers left the room while the subjects completed the questionnaire.

Job satisfaction was measured by the use of the Job Descriptive Index (JDI) developed by Smith, Kendall, and Hulin (1969). This instrument provides data on five elements of job related satisfaction—satisfaction with work, supervision, co-workers, pay, and promotion. Role stress measures included a 13-item job related tension and anxiety scale, an 8-item role conflict scale, and a 6-item role clarity scale (Rizzo, House, & Lirtzman, 1970). The respondents' perception of their personal competence was obtained by using a scale containing 23 items (Wagner & Morse, 1975). This latter measure refers particularly to an individual's feelings and confidence about his abilities in mastering an organizational and work setting. Individuals scoring low on this scale feel that control and influence are external to them. Subsequently, they feel that they have little power to influence the work setting.

Results

Data from all the facilities were combined for the present study because the proportions of union members were equal across all three facilities and there were no significant differences on the criteria among the facilities. An analysis of covariance (Kirk, 1968) was used to test the research hypotheses as there were significant differences between union members and nonmembers on measures of formal education, organizational tenure, and position tenure.

Data pertaining to the research hypotheses may be found in Table 2. From the unadjusted means, it appears that Hypothesis 1 was partially supported. Union members reported significantly lower levels of satisfaction with work and pay than did nonmembers. Hypothesis 2 also was supported by the unadjusted means as union members reported significantly higher levels of job related tension and anxiety and role conflict than did nonmembers. The unadjusted means in Table 2 also provide support for Hypothesis 3 as union members reported lower levels of personal competence than did nonmembers.

TABLE 2
A Comparison of Levels of Job Satisfaction, Role Stress, and Personal Competence for Union Members and Nonmembers

	Unadjusted Means			*Adjusted Means*[a]		
Measures	*Union*	*Nonunion*	*p*	*Union*	*Nonunion*	*p*
Satisfaction with work	27.76	30.03	*	27.64	30.12	*
Satisfaction with pay	13.02	15.55	*	12.98	15.98	*
Satisfaction with position	17.33	17.79		16.94	17.84	
Satisfaction with co-workers	35.91	36.17		36.12	35.55	
Satisfaction with supervision	35.17	34.55		35.44	33.80	
Job related tension and anxiety	2.75	2.49	**	2.72	2.55	
Role conflict	2.73	2.49	*	2.74	2.55	
Role clarity	3.49	3.46		3.47	3.54	
Personal competence	72.78	75.34	**	72.87	74.25	

[a] Adjusted for covariates of formal education, position tenure, and organizational tenure.
*$p<.10$
**$p<.05$

However, when the unadjusted means are adjusted for the differences between union members and nonmembers on measures of formal education, organizational tenure, and position tenure, the only hypothesis that receives statistical support is Hypothesis 1. That is, after controlling for differences in the demographic measures, union members still report significantly lower levels of satisfaction with work and pay.

Thus, interpretation of the data relative to Hypotheses 2 and 3 is clouded by the fact that union membership and demographic variables are significantly correlated with one another and with the measures of role stress and personal competence. Even though the adjusted mean differences on the measures of job related tenure and anxiety, role conflict, and personal competence are still in the hypothesized directions, they are not statistically significant ($p<.10$).

Discussion

It was not possible in the present study to determine the impact of union membership on union members' job attitudes because pre-union data were not available. Subsequently, the lower satisfaction and greater role stress of union members in comparison to nonmembers should not necessarily be interpreted as a failure of the union to improve working conditions of union members.

The reader also should note that the union sample had no legal standing under state or federal law. Therefore, generalizations from this study to a union with a collective bargaining agreement duly recognized by state and/or federal labor law may be limited. It could be that this absence of legal standing led to "inactive" union membership, a condition that has been found in previous studies to be linked with lower levels of job satisfaction (March, 1965).

However, the data of the present study do raise significant questions about personality correlates of union membership. Future studies that attempt to predict pro-union behavior should include personality measures of competence/self-esteem and measures of job satisfaction and role stress as predictors. It could be that the source of dissatisfaction/role stress experienced by the pro-union employee is the employee himself instead of the organization.

The results of the study also should interest union leaders, especially if they are concerned about the increasing number of successful decertification elections. Perhaps unions should begin to monitor union members' attitudes toward the company and the union. It could be that these attitudinal measures will predict the outcomes of decertification elections as well as representation elections.

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INFORMAL INFLUENCE IN THE FORMAL ORGANIZATION: PERCEIVED SOURCES OF POWER AMONG WORK UNIT PEERS

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The notion that power and influence are based largely on some set of power resources has been a popular one which appears theoretically strong as well. Although a number of power base typologies have been advanced, the typology offered by French and Raven (1959) appears to be the most robust both in terms of popular application and in its ability to subsume other typologies. This well-known typology posits five bases of power, including legitimate authority, expertise, reward, and coercive and referent power.

A great deal of research has been done using French and Raven's typology or ones similar to it. The majority of such research conducted in the work place, however, has been limited to the study of the relationship between power base utilization and either compliance with supervisory directives or measures of production. No research has been conducted that measures the relationship between power base utilization and informal influence in the organization (i.e., lateral influence among work unit peers and influence exercised by subordinates over their supervisor). Still another gap exists regarding legitimate organizational authority. Classical notions maintain that authority is delegated from above. Neoclassical and behavioral notions recognize the importance of subordinate acceptance of authority. The *attribution* of legitimate organizational authority by workers to those who have not been formally delegated such authority, however, has not been examined.

In an effort toward filling these gaps in the knowledge of power base use and toward increasing the understanding of informal power use in the organization, the following hypotheses were tested:

> *Hypothesis 1: Informal influence expressed laterally between work unit peers (II_{Lat}) is significantly and positively correlated with each of French and Raven's power bases.*

Hypothesis 2: Informal influence expressed up the chain of command (II_{Up}) is significantly and positively correlated with each of French and Raven's power bases.

Two methods were used to test and explore these hypotheses. First, power base measures were correlated with each measure of informal influence. Second, stepwise multiple regression analysis was employed to partial out covariance among power base measures and indicate the independent contribution each power base made to each direction of influence.

Methodology

Sample—Eighty volunteers in 12 work units across four public and quasi-public organizations located in the Pacific Southwest contributed data to test the hypotheses. Subjects included blue collar, clerical, and professional staff employees. No subject was used who had formal authority over any other subject. Of the volunteers, 77 provided usable data to test the hypotheses.

Measures—One item was used to measure each of the five power bases. Single item measures were used because of the time constraints involved. Although it is common practice to use single item measures in power base research, it should be noted that theoretically they tend to give less reliable data than do multi-item measures (Nunnally, 1967). This, in turn, can produce lower correlation coefficients than if multi-item measures are used. The items used here were similar to those used by Student (1968) and Ivancevich (1970). The item used to assess the legitimate power base was changed so that it would not be tied to the supervisory position as such. Both Student (1968) and Ivancevich (1970) reported that, in the main, their items were associated with their dependent variables as predicted. In addition, the zero order correlations between items were similar across the two studies.

The items used here assessed the extent to which the respondent agreed that the target co-worker was one of the nicest people he/she knew (referent), had good judgment and knew how to get things done in the work place (expertise), could see to it that others were rewarded for their work (reward), could make things difficult for others (coercive), and had legitimate organizational authority over the things done by co-workers (legitimate).

Six items were used to measure informal lateral influence among work unit peers (II_{Lat}) and six more were used to measure informal influence with the supervisor (II_{Up}). All items employed 5-point scales and assessed only work unit matters.

Three of six items for II_{Lat} asked the respondent how often the target subject was sought out for advice at work, took charge of group discussions, and was included in discussions before a decision was made. "Never" and "always" anchored the scale. The three other items asked how much influence the target subject had over developing informal agreements among work unit members, making sure that the work unit stuck together and that work members were working and getting along together. This format was modeled after Tannenbaum's Control Graph (1961) with the scales anchored with "none" and "very great." Coefficient alpha for the six items used to measure $\mathrm{II}_{\mathrm{Lat}}$ was .872.

Three of six items for $\mathrm{II}_{\mathrm{Up}}$ asked the respondent how often the target subject was consulted by the supervisor on work unit matters, was given special consideration in work matters, and was allowed by the supervisor to take charge of things. "Never" and "always" anchored the scales. The three other items, also modeled after Tannenbaum (1961), asked how much influence the target subject had over determining formal policies and actions of the work unit, day-to-day supervisory decisions, and periodic supervisory decisions such as promotions, evaluations, hiring, etc. These scales were anchored with "none" and "always." Coefficient alpha for the six items used to measure $\mathrm{II}_{\mathrm{Up}}$ was .888.

Procedures—A cross-sectional survey research design was used in this study. Each subject respondent was required to rate two of his or her work unit peers on the items presented and was, in turn, rated by two of his or her peers. Each subject, therefore, was both a judge of two co-workers and a target subject judged by two different co-workers. Assignment of subjects to one another was random. This procedure resulted in 75 pairs of judges rating a work unit peer. (Two subjects had data from only one judge.) Because the usual procedure of correlating interjudge ratings could not be applied to this situation, other measures of interjudge agreement were developed. This entailed subtracting the score of one judge from that of the other and examining the resulting distribution of difference scores for each measure. The statistics examined were the mean difference score between the judges' ratings ($\bar{D}$), the standard deviation of those differences (δ), and the percent of interjudge ratings within ± 1 and ± 2 units of one another. The results were as follows:

1) $\mathrm{II}_{\mathrm{Lat}}$	$\bar{D} = .084$	$\delta = .8$	$\pm 1 = 82.4\%$	$\pm 2 = 100\%$
2) $\mathrm{II}_{\mathrm{Up}}$	$\bar{D} = -.011$	$\delta = .71$	$\pm 1 = 87.8\%$	$\pm 2 = 100\%$
3) Legitimate	$\bar{D} = -.040$	$\delta = 2.07$	$\pm 1 = 53.3\%$	$\pm 2 = 81.4\%$
4) Expertise	$\bar{D} = -.147$	$\delta = 1.41$	$\pm 1 = 76.0\%$	$\pm 2 = 92.0\%$
5) Referent	$\bar{D} = .135$	$\delta = 1.75$	$\pm 1 = 67.5\%$	$\pm 2 = 86.4\%$
6) Reward	$\bar{D} = .041$	$\delta = 2.12$	$\pm 1 = 58.1\%$	$\pm 2 = 77.0\%$
7) Coercive	$\bar{D} = .053$	$\delta = 1.85$	$\pm 1 = 69.3\%$	$\pm 2 = 81.3\%$

Results

Variable measures for each target subject were provided by two co-workers. The ultimate scores for both dependent and independent variables then were calculated by averaging the responses provided by the two judges. In two cases only one judge provided data. In these cases those data alone were used.

To test the two hypotheses, II_{Lp} and II_{Lat} scores were correlated with each power base. The results are given in Table 1.

TABLE 1
Correlation Matrix[a]

Variables	II_{Up}	II_{Lat}	*REF*	*EXP*	*REW*	*COER*	*LEG*
REF	.11123	.25405*	1				
EXP	.27983*	.43043**	.75370**	1			
REW	.36636**	.48582**	.58490**	.56800**	1		
COER	.01293	-.16013	-.48253**	-.36432**	-.38195**	1	
LEG	.67861**	.64709**	.16955	.21673	.37327**	-.05042	1

[a] Variables are as follows: II_{Up}—Informal influence exercised up the chain of command; II_{Lat}—Informal influence exercised laterally between peers; REF—referent power; EXP—expertise power; REW—reward power; COER—coercive power, LEG—legitimate power.

* $p \leq .05$

** $p \leq .01$

These simple correlational results provided general but mixed support for both hypotheses. Surprisingly, the attribution of "legitimate organizational authority" not only was correlated with both II_{Up} and II_{Lat}, but was associated more with the variance of these dependent variables than was any other variable. Although not related to the hypotheses directly, Table 1 reports the correlation coefficients of each power base to one another.

In order to ascertain the independent contributions of each predictor variable toward the criterion variables, stepwise multiple regression analysis was used. Table 2 reports the R^2 and R^2 change accompanying the entry of each independent variable.

TABLE 2
Stepwise Regression Results

Informal Influence Exercised Up the Chain of Command (II_{Up})

Independent Variable	R^2	R^2 *Change*
Legitimate	.46051	.46051
Expert	.47901	.01849
Referent	.50391	.02490
Reward	.51614	.01223
Coercive	.52136	.00522

Informal Influence Exercised Laterally Between Peers (II_{Lat})

Independent Variable	R^2	R^2 *Change*
Legitimate	.41873	.41873
Expert	.50709	.08836
Reward	.52214	.01505
Referent	.54676	.02462
Coercive	.54812	.00136

The results shown in Table 2 indicate once again that attributions of legitimate organizational authority by work unit peers account for the majority of explained variance for both criterion variables. Equally conclusive is the finding that coercive power contributes the least explained variance for both criterion variables. The remaining variables contribute varying amounts of explained variance, and the exact order of contribution to criterion variance cannot be firmly established.

Discussion

Of note in this study were the correlations found between perceptions of legitimate organizational authority and both directions of influence. This power base accounted for approximately 46 percent of the variance with perceptions of informal influence over the supervisor and 42 percent of the variance with perceptions of informal influence over work unit peers. This was an interesting finding because no one had actually been delegated such authority. Classical theory maintains that authority can only be delegated to specific positions within the organization. The notion that authority had to be accepted by subordinates served to extend the thinking regarding this concept (Barnard, 1938; Simon, 1957). This finding suggests that the concept of legitimate organizational authority can be extended further to include the notion that authority has an *attributional* side as well. If this is, in fact, true, it has significance in terms of both organizational theory and the practice of management. The particular significance of this finding remains to be explored further, but a number of tentative explanations that must await empirical validation can be offered in this regard.

It may well be the case that co-workers hold to the notion that job responsibilities and authority should be and in fact are related. The execution of job responsibilities often requires the cooperation of co-workers. In these instances a co-worker could well perceive that authority to enlist his or her aid could be an integral part of the job itself. This perception may first be developed via work socialization and maintained via supervisory and organizational practices (Patchen, 1974; Strauss, 1962). If this is the case, attributed authority such as found here has implications as far back as Mary Parker Follet's notion of situation authority and may have bearing on the theory and practices of organic organization.

It also may be the case that those who are subject to informal influence attribute authority to the power holder in order to maintain an image of self-potency with regard to themselves. Krauss (1976) provides support for this explanation. He found that perceptions of self-potency were less with subjects who were subjected to illegitimate power in an interviewing situation than with those who were subjected to legitimate power. This finding, together with balance theories (e.g., cognitive dissonance theory), suggests that as a person becomes influential his peers attribute legitimate authority to him to maintain their own perceptions of self-potency.

A final explanation may be found in the fact that attributed authority was tied to upward influence. Perhaps as a worker perceives another to be influential with the supervisor, a perceptual transference of authority from the supervisor to the influential peer takes place which, in turn, manifests itself in lateral relations as well.

Although all these explanations are plausible, they must remain tentative. However, the attributional side of legitimate organizational authority remains an important finding and therefore commands further research.

The remaining relationships between power bases and informal influence serve to extend past research findings to the workplace. In addition, they support common sense, but as yet unconfirmed, notions regarding power base utilization and provide some additional insight into the exercise of informal influence in the formal organization.

Expertise and reward power were found to be related to both directions of influence. Referent power, on the other hand, was found to be modestly related to lateral influence but not significantly related to perceived influence over the supervisor. Coercive power was not significantly related to either direction of influence.

Expertise, reward, referent, and coercive power bases all were significantly intercorrelated. Only reward power, however, was intercorrelated with attributed organizational authority. Additional research might be directed toward a greater understanding of the reward power link between attributed authority and the other power bases. It may be that reward power plays a key role in power base acquisition in informal influence. If a work unit member is perceived as having reward power, this may give rise to, or augment, other power bases at his or her disposal. Supervisors, then, may want to delegate some of their reward power to subordinates who share organizational goals. On the other hand, attributed authority may augment perceptions of reward power. In this case supervisors may wish to promote such attributions for subordinates who share organizational goals.

In conclusion, although interesting findings were generated by this research, caveats must be issued. First, respondents were volunteers, as were the public and quasi-public organizations. Even though over 95 percent of the subjects asked chose to participate, these results may be specific to this sample. Second, the reputational approach was used to assess influence. This may contribute to method variance. Third, only the relationship between influence and power bases was explored. More work needs to be done to incorporate such issues as structure, environment, group processes, and leadership before a full understanding of power relations can be developed. It should be noted as well that the two directions of influence were intercorrelated (.83), suggesting either that one influence variable is being measured or that upward and lateral influence covary even though they may, in fact, be manifest via different processes. A final caveat should be issued with regard to the measures themselves. The measures of informal influence were judged to be valid by a number of judges on face validity alone, and 1-item measures of power, though commonly used, undercut reliability which, in turn, can be expected to reduce the magnitude of correlations.

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PERCEIVED LEADER BEHAVIOR AS A FUNCTION OF THE LEADER'S INTERPERSONAL TRUST ORIENTATION[1]

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The present study is concerned with a variable that has been generally regarded as an important attribute for effective leader-subordinate interaction but has been largely neglected in leadership research—namely, the interpersonal trust orientation of the leader.

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Rosenberg (1956) and Rotter (1967, 1971) have attempted to measure interpersonal trust with questionnaires designed to reflect attitudes toward human nature and political ideology. Both questionnaires presumably measure the degree to which an individual expects that other persons may be relied upon. As a generalized expectancy, interpersonal trust should not only affect an individual's perceptions of others but also an individual's behavior toward others. Rosenberg has contended that persons with low interpersonal trust would be expected to have difficulty in establishing close friendships and also, if placed in a leadership position, should be less apt to permit freedom of action in subordinates.

From the Rosenberg contention, it follows that leaders who are high in interpersonal trust should be perceived by subordinates as exhibiting behaviors that reflect their basic trust in human nature. To this end, it would be expected that leaders who are high in interpersonal trust would be rated high on the Ohio State Leader Behavior Description Questionnaire (LBDQ) scales of consideration and tolerance of freedom. In addition, it would be expected that subordinates reporting to leaders with high interpersonal trust would be more satisfied than would subordinates reporting to leaders who were low in interpersonal trust. The present study also offers the opportunity to examine whether leader interpersonal trust would be related to the additional LBDQ scales of initiating structure, persuasion, and production emphasis.

Method

Sample—The sample consisted of 149 freshman cadets and 41 cadet leaders in the military corps of cadets at two southern universities. From one institution that was entirely military, 35 cadet leaders and 98 freshman cadets from 35 squadrons participated. Each squadron contained a cadet leader and 10 subordinates with approximately 80 percent being freshmen. From the other institution, which was primarily civilian, 6 cadet leaders and 51 freshman cadets from 6 squadrons participated. Each squadron contained a cadet leader and 40 subordinates with approximately 33 percent being freshmen.

The procedures for sampling were the same in both settings. The cadets were informed in advance that testing would be voluntary and administered during their free period. At the session they were also assured of anonymity.

Instruments—In the spring of their first year, freshman cadets completed a test booklet that contained: (a) the Ohio State Leader Behavior Description Questionnaire (LBDQ) and (b) the complete Job Descriptive Index (JDI). The 41 cadet leaders completed the Rotter Interpersonal Trust Scale.

Cadet subordinates evaluated their leader's behavior by completing five scales from Form XII of the LBDQ (Stogdill, 1963). The dimensions of the LBDQ used were persuasion, initiating structure, tolerance of freedom, consideration, and production emphasis. Two items normally included on the persuasion scale were not included in this study because it was felt that they were inappropriate to the military cadet.

The cadet subordinates indicated the satisfaction with their leaders by completing the Supervision Scale of the JDI (Smith, Kendall, & Hulin, 1969). Instead of evaluating "supervision on the job," the cadet subordinates were asked to evaluate their cadet leader on the 18-item adjective checklist. Although all scales of the JDI were administered to the cadet subordinates, only the Supervision Scale was used for the present study.

The Rotter Interpersonal Trust Scale (Rotter, 1967, 1971) is a questionnaire consisting of 40 statements, each rated for agreement on a 5-point graphic basis. The items reflect the degree of generalized trust towards particular aspects of political and social elements in society. Two items, for example, are: "Most elected public officials are really sincere in their campaign promises" and "Most people can be counted on to do what they say they will do."

Results

The distribution of interpersonal trust scores of the 41 cadet leaders ($M = 68.44$, $S.D. = 12.12$) was consistent with the norms for college students reported by Hochreich and Rotter (1970). Means and standard deviations for the six response measures were as follows: consideration ($M = 24.69$, $S.D. = 7.67$), initiating structure ($M = 25.58$, $S.D. = 7.38$), tolerance of freedom ($M = 23.62$, $S.D. = 6.67$), persuasion ($M = 17.07$, $S.D. = 6.76$), production emphasis ($M = 22.87$, $S.D. = 7.41$), and satisfaction with the leader ($M = 41.37$, $S.D. = 8.79$).

Leader interpersonal trust was significantly correlated with the measures of consideration, $r = .33$, $p < .01$; tolerance of freedom, $r = .32$, $p < .01$; persuasion, $r = .26$, $p < .01$; initiating structure, $r = .21$, $p < .05$; and satisfaction with the leader, $r = .25$, $p < .01$. Production emphasis failed to correlate significantly with leader interpersonal trust, $r = .06$, $p > .05$. Because of the situational differences between the two schools, partial correlations were computed between leader interpersonal trust and the six measures with the institution variable controlled. The partial correlations revealed that leader interpersonal trust was positively related to consideration, $r = .21$, $p < .05$; tolerance of freedom, $r = .20$, $p < .05$; and satisfaction with leader, $r = .17$, $p < .05$. Leader interpersonal trust was not found to be significantly correlated with persuasion, $r = .15$, initiating structure, $r = .08$, or production emphasis, $r = .01$, $ps > .05$.

Discussion

The results indicate that, in an applied setting, leader interpersonal trust is one variable that may influence the manner in which subordinates perceive leader behavior. The hypothesis that leader interpersonal trust would be related to the LBDQ scales of consideration and tolerance of freedom was confirmed. In addition, the contention that leader interpersonal trust would be significantly related to subordinate satisfaction with leadership was supported.

An examination of the items on the two LBDQ-Form XII scales that were found to be significantly related to leader interpersonal trust reveals that each scale reflects some aspect of personal communication by the leader. This finding is consistent with the position taken by O'Reilly and Roberts (1974) that high trust facilitates organizational communication. In general, the items within the consideration and tolerance of freedom scales are specifically concerned with behaviors that are relevant to personal interactions between leaders and subordinates.

The lack of significant partial correlations between leader interpersonal trust and the measures of initiating structure and persuasion suggests that judgments of behavior that are task oriented are moderated by the organizational constraints of the military-college setting. Because the two institutions sampled in the present study differed along a number of dimensions (e.g., size of squadrons, percentage of freshmen per squadron, and presence of civilian population), an exact delineation of alternative hypotheses was not possible.

The present findings have implications, however, for present and future theories of leadership. It would seem that leader interpersonal trust might be considered as a potential moderator of successful leader-group interaction. Within the Fiedler (Fiedler & Chemers, 1974) contingency model, for example, it is clearly stated that the elements of *task structure* and *position power* are secondary to the acceptance of a leader by subordinates. It is entirely possible that acceptance by group members might never be fully achieved when their leader's interpersonal trust orientation is low. Within the vertical dyad linkage approach (Dansereau, Graen, & Haga, 1975), *negotiating latitude* is conceptualized as an exchange process in which mutual trust is developed over a series of interactions between leader and subordinate. The implication from the present data would be that the success of such an exchange process would be dependent to a great deal on the interpersonal trust of the leader.

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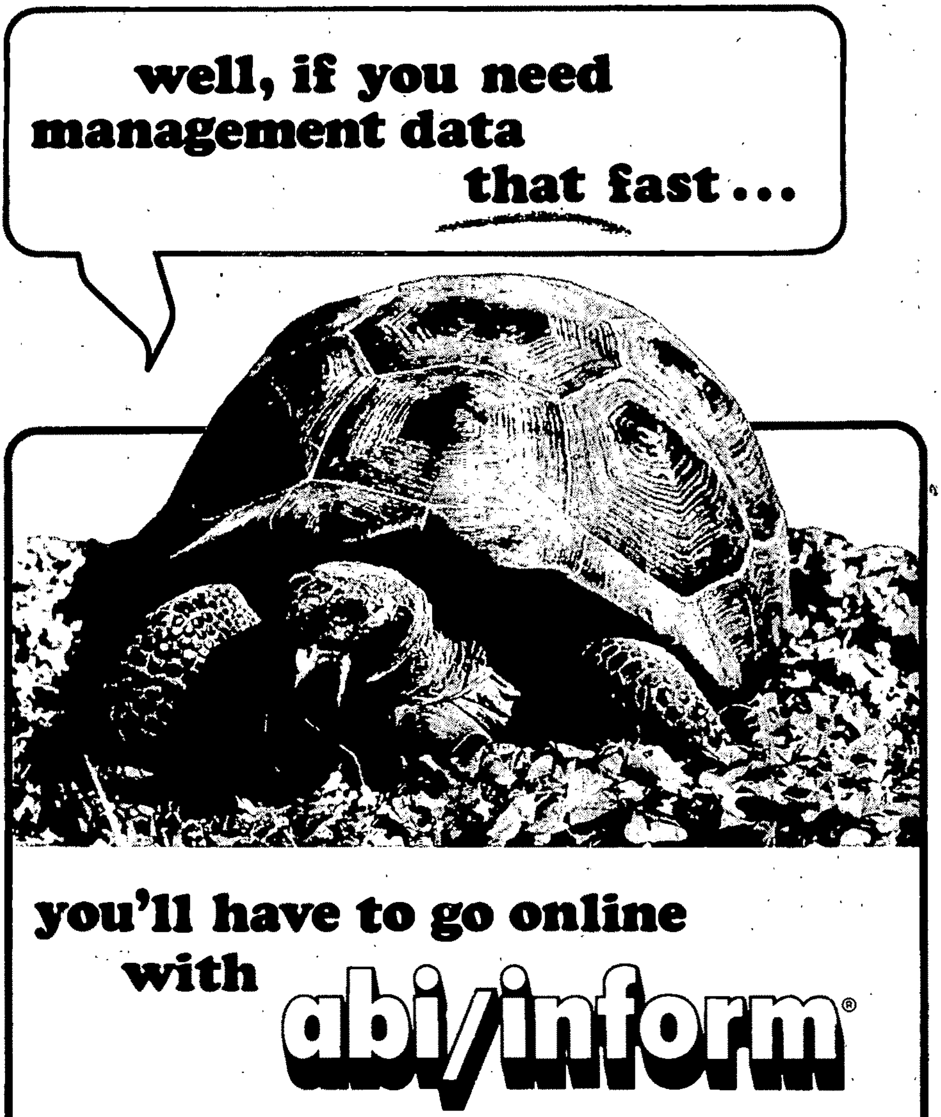
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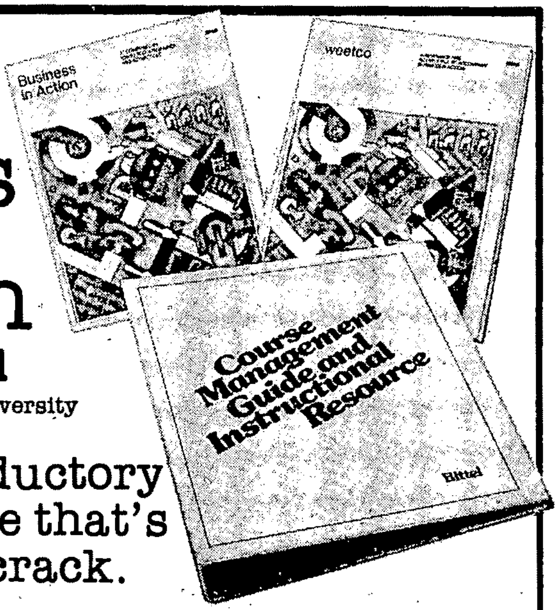

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Strategy, Structure, the Environment, and Financial Performance in 48 United Kingdom Companies

PETER H. GRINYER
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St. Andrews University
SHAWKI AL-BAZZAZ
Kingston Regional Management Centre

Data from 48 large United Kingdom companies are analyzed to test 22 hypotheses relating to the linkages of strategy, structure, the environment, and financial performance. Among other results, the strategy/structure linkage is shown to be very stable, and the fit between strategy and structure was found to be negatively correlated with perceived environmental hostility but unrelated to financial performance.

A growing and familiar body of literature has explored the relationships between strategy and structure (Chandler, 1962; Stopford, 1968; Fouraker & Stopford, 1968; Wrigley, 1970; Dyas, 1972; Pavan, 1972; Thanheiser, 1972; Channon, 1973, 1975; Rumelt, 1974), the environment (Franko, 1974; Galbraith & Nathanson, 1978), and financial performance (Rumelt, 1974; Channon, 1975). Hypotheses intended to extend this earlier research were tested statistically using data collected during interviews with senior managers within 48 large United Kingdom companies. These hypotheses relate to the correlates of strategy and structure; relationships among strategy, structure, and environmental hostility; and relationships among strategy and structure, their match, and measures of performance.

Data for subsequent analysis were collected in a cross-sectional survey of 48 UK companies with head offices in the southeast of England. These were drawn from 18 different industries. Of the companies, 25 percent were in service industries, 43 percent in manufacturing, and 32 percent in both. All the companies were large (£200 million average sales), 77 percent were owned in the United Kingdom, 12 percent in the United States, 4 percent in the European Economic Community (EEC) outside the United

TABLE 1
Classification of Sample by Strategy and Structure[a]

Strategy/Structure	*Functional*	*Geographical Divisions*	*Product Divisions*	*Product & Geographical Divisions*
Single product	5	2	1	–
Dominant product	5	1	4	1
Related product	8	1	9	8
Unrelated product	–	–	2	1
Total	18	4	16	10

[a] These scales are derived from Wrigley (1970).

Kingdom, and 4 percent jointly by UK and non-UK residents. The distribution of members among Wrigley's (1970) strategic categories and among points on an ordinal scale for degree of divisionalization of structure is shown in Table 1.

Data were obtained during structured interviews with the director or most senior manager responsible for corporate planning. Organization charts and financial reports were collected to add information on structure, size, and financial performance.

Ordinal and ratio scales, as appropriate, were developed from responses on strategy, structure, other company characteristics, perceived environmental factors, and financial performance (see Grinyer, Al-Bazzaz, & Yasai-Ardekani, 1978; and Al-Bazzaz, 1977). Because a large proportion of the most important scales, like those for strategy and structure, are ordinal, nonparametric analysis was preferred, for reasons advanced persuasively by Siegel (1956), although Pearson's product moment coefficients were used at certain points in the analysis to permit first order partial correlations. To allow further for control of some of the main variables, the sample was subdivided on the basis of specific variables, and nonparametric correlation was undertaken in each subsample for the remaining variables.

HYPOTHESES

An assumption often is made in the literature that product divisional structures involve greater vertical and lateral spans of control. A greater vertical span of control, defined as the number of levels within the core workflow hierarchy, is implied by interposing an additional, divisional, level between the chief executive and the peripheral business units. Similarly, it often is assumed that a greater number of specialist staff officers report to the chief executive at the head office, thus increasing his lateral span of control. These linkages between divisionalization of organizational structure and the more traditional measures of height and width of the hierarchical pyramid have not, to the present authors' knowledge, been tested statistically and certainly not in the United Kingdom. Table 2 shows the hypotheses, H.1.1 and H.1.2, advanced in consequence.

TABLE 2
Hypotheses

H.1.1 Vertical span of control (number of levels in the core work flow hierarchy) and degree of divisionalization are positively correlated.
H.1.2 The chief executive's lateral span of control and degree of divisionalization are positively correlated.
H.2.1 Degree of diversification (strategy) and degree of divisionalization (structure) are positively correlated.
H.2.2 This positive correlation (H.2.1) remains significant when allowance is made for other correlates of structure and a variety of environmental conditions.
H.2.3 The correlation (H.2.1) remains significant for service companies, manufacturing companies, and those combining both manufacturing and service activities.
H.3.1 Size of companies is positively correlated with their degree of diversification.
H.3.2 Size of companies is positively correlated with their degree of divisionalization.
H.4.1 The number of sites and the degree of divisionalization are positively correlated.
H.4.2 The geographical dispersion of major sites and the degree of divisionalization are positively correlated.
H.5.1 Among companies with "related" or "unrelated" product strategies (Wrigley, 1970) perceived environmental pressures and degree of divisionalization are negatively correlated.
H.5.2 Among companies with "single" or "dominant" product strategies (Wrigley, 1970), perceived environmental pressures and degree of divisionalization are positively correlated.
H.5.3 The better the "fit" or "match" between strategy and structure, as suggested by Chandler (1962) and Galbraith and Nathanson (1978), the lower perceived environmental pressures will tend to be.
H.6.1 Return on capital employed (ROI) and measures of growth are positively correlated with degree of diversification.
H.6.2 Variability of ROI and the degree of diversification are negatively correlated.
H.6.3 ROI and measures of growth are greater and variability in ROI is less for divisionally than for functionally organized companies.
H.6.4 Related product companies will, on average, have higher ROI, higher rates of growth, and lower variability of ROI than other categories.
H.6.5 Divisionalized related product firms outperform those that are functionally organized.
H.7.1 Among functionally organized companies average ROI and growth are inversely related to degree of diversification.
H.7.2 Among product divisionally organized companies average ROI and growth are positively correlated with degree of diversification.
H.7.3 Among single or dominant product companies average ROI and growth are negatively correlated with degree of divisionalization.
H.7.4 Among companies with related and unrelated product strategies, average ROI and growth are positively correlated with the degree of divisionalization.
H.8.1 Where the rate of technological change is high, the market is turbulent, or there are indications of strong competitive pressures, average ROI and growth are positively correlated and variability of ROI is negatively correlated with the degree of diversification.
H.8.2 Under conditions described in H.8.1, average ROI and growth are positively and variability in ROI is negatively correlated with the degree of divisionalization.

Second, Chandler (1962) hypothesized a positive relationship between strategy and structure, since tested statistically by Rumelt (1974) in the United States and by Channon (1975) among UK service companies. There seems to be value, if little originality, in testing the relationship statistically using a multi-industry sample of UK companies. The basic hypothesis may be extended, however, once one establishes other factors that impinge upon structure. One can argue that the relationship is sufficiently independent of other factors that affect structure to remain significant when one controls for the latter. Again, it can be argued that the relationship remains significant no matter whether the companies involved are service, manufacturing, or both (as with IBM). The second set of hypotheses, then, is H.2.1 through H.2.3 in Table 2.

Third, one must recognize the wealth of other evidence suggesting that strategy is but one determinant of structure. For instance, Pugh, Hickson, Hinings and Turner (1968, 1969) and Child (1972) showed that size and measures of organization structuring are strongly positively correlated. Divisional organizations tend to be more "structured," in some respects than do nondivisional ones, because of the introduction of corporate planning and financial control systems to coordinate and control the lower hierarchical levels from the head office (Berg, 1971; Channon, 1973). If these earlier studies are an appropriate guide, then size and divisionalization of structure may well be positively correlated. To this should be added a further argument that goes to the roots of the strategy/structure debate. Chandler (1962) perceived that corporations expand geographically, diversify, then move to divisional structures as they grow. Thus, for this reason alone, one might find a positive correlation between size and divisionalization of structure. Similarly, one would expect to find size positively correlated with strategy itself. These arguments suggest the third set of hypotheses, H.3.1 and H.3.2, in Table 2.

Fourth, the number of separate sites operated by a company and their geographical dispersion may be related to both size and structure. For some types of business, the number of sites may be expected to be strongly positively correlated with size of the company, especially in service industries such as banking, restaurants, and retailing. This need not necessarily be the case, however, when the sample contains as many diverse organizations as does that of the present study. However, the linkage between the number of sites and divisionalization is likely to remain, even if other measures of size are not strongly correlated with the former, because a multiplicity of sites can create a complexity and difficulty of coordination and control of its own kind, as does wide geographical separation of major site locations (Chandler, 1962; Stopford, 1968; Fouraker & Stopford, 1968). In each case the appropriate organizational response may be a geographically based divisional structure. This suggests Hypotheses H.4.1 and H.4.2.

Fifth, a theme on which Galbraith and Nathanson (1978) concentrate is that a good fit of structure to strategy promotes better coping with the environment. Franko (1974) observed that increased competition and hence a more hostile environment was necessary to force European companies to adopt structures to fit their strategies. This is consonant with the causal argument of Chandler himself (1962). Structure follows strategy because of pressures generated by a poor fit. In each case, either external or internal pressure is seen to force the change to an appropriate structure. *Perceived* rather than some other objective levels of external pressure are of concern here. Internal pressures stemming from an inappropriate structure are more difficult to gauge but could be expected, with external pressures, to contribute to deterioration of financial performance. Hypotheses H.5.1-H.5.3, which have not been tested to date, follow (see Table 2).

To date there are no published results of a United Kingdom study to parallel Rumelt's (1974) analysis of strategy, structure, and financial performance among the *Fortune* 500 companies. Because Wrigley's (1970) scale for structure was used here rather than Rumelt's extension, and the financial data are different, a complete replication of the American study is not possible using data in the present study. However, some of the hypotheses Rumelt developed may be tested using the present data, and these are advanced in H.6.1-H.6.5.

Finally, good match or fit between structure and strategy might be expected to lead to good performance and vice versa. This suggests further hypotheses, H.7.1-H.7.4. Because of the greater spread of business interests and the greater adaptability claimed for divisionally structured companies in meeting environmental perturbations, it may be argued that even if no other relationships with financial performance are found, such companies should perform better in adverse conditions (see Hypotheses H.8.1 and H.8.2 in Table 2).

TESTING OF HYPOTHESES

Wrigley's Structural Scale, Vertical and Lateral Spans of Control

Lateral and vertical spans of control were correlated with scores obtained using an ordinal scale for structure. Kendall's tau was .25 and .27 for each respectively. Both coefficients are significant at the .05 level. No significant correlation between vertical and lateral spans of control was found. The null form of Hypotheses H.1.1 and H.1.2 can be rejected. Both lateral and vertical spans of control are significantly and positively correlated with the ordinal scale for structure ranging from low for functional, through geographically divisional, then product divisional, to highest for product and geographically based divisional structures. The fact that the coefficients were not higher clearly indicates, however, that other factors too are strongly related to lateral and vertical spans of control.

Strategy, Structure, and Size

Hypotheses H.2.1-H.4.2 all relate to strategy, structure, and aspects of size. For this reason, and for analytical convenience, they are treated together. Table 3 shows nonparametric correlation coefficients. The highly significant, positive correlation between *strategy* and *structure* found by Rumelt (1974), and more recently by Channon (1975) in his study of United Kingdom service industries, is found here too. For the sample as a whole, strategy is completely uncorrelated with charter, number of sites, the geographical dispersion of major operations, or with measures of size. The latter can be explained in part by the inclusion in the sample of giants in mature industries, such as coal mining and steel. As in

TABLE 3
Nonparametric Correlation Coefficients (Kendall's tau) for Strategy, Structure, Sites, Dispersion, and Size

	Strategy	*Structure*	*Charter*	*Number Sites*	*Dispersion*	*Capital Employed*	*Sales*	*Number Employed*
Strategy	1.00	.36***	NS	NS	NS	NS	NS	NS
Structure		1.00	–.36***	.35***	.24**	.19*	.29**	.33***
Charter			1.00	–.20*	NS	NS	NS	NS
Number sites				1.00	.24**	.37***	.36***	.42***
Dispersion					1.00	NS	.18*	NS
Capital employed						1.00	.82***	.48***
Sales							1.00	.50***
Number employed								1.00

NS: Not statistically significant.
*Significant at the .05 level
**Significant at the .01 level
***Significant at the .001 level

the United States, such single product or dominant product companies have not shown a marked propensity to diversify. Indeed, in the United Kingdom these two industries are dominated by nationalized concerns whose very statutory origins preclude it.

The very uniqueness of the strategy/structure correlation suggests that it is unlikely to be attributed to any third variable in the analysis to which structure is strongly positively correlated. This was confirmed by calculating the Pearson's product moment coefficients, which were consistent with the nonparametric ones of Table 3, and by deriving the appropriate first order correlation coefficients shown in Table 4. Strategy and structure remain significantly, positively correlated, and this relationship seems to be independent of other influences on structure such as charter and size. Thus Hypotheses H.2.1, H.2.2 and H.2.3 were found valid.

Other Correlates of Structure

Table 3 shows that, although strategy is significantly correlated with structure, it accounts for a small proportion of the total variance. Charter, geographical dispersion and number of sites, number of employees, annual sales, and capital employed are all significantly correlated with *structure*. As would be expected, the number of sites is positively correlated at a high level of significance with each of the three measures of size, which are themselves strongly intercorrelated. The number of sites is also negatively correlated with charter, suggesting that service companies tend to have more operating sites than do manufacturing ones, as is to be expected from the inclusion of several banks and an insurance company in the sample of 48.

TABLE 4
Strategy and Structure Related First Order Partial Correlation Coefficients

	Controlling for:					
	Strategy	*Charter*	*Number Sites*	*Geographical Dispersion*	*Number Employees*	*Annual Sales*
Strategy/structure	NA	.41**	.49***	.45**	.43**	.43**
Structure/charter	-.39**	NA	-.31*	-.37**	-.39**	-.39**
Structure/number sites	.44**	.29^{s}	NA	.31*	.28^{s}	NS
Structure/geographical dispersion	.30*	NS	NS	NA	NS	NS
Structure/number employees	.28*	.25^{s}	NS	.25^{s}	NA	NS
Structure/sales	.40**	.39**	.27^{s}	.36*	.31*	NA
Structure/capital employed	.35*	.28*	NS	.31*	.22^{s}	NS
Structure/difficulty of supply	-.33*	NS	NS	-.31^{s}	-.41**	.35*

	Controlling for:					
	Capital Employed	*Difficulty of Supply*	*Number Sources of Past Turbulence*	*Number Sources of Expected Turbulence*	*Need for New Product Innovation*	*Rate of Technological Change*
Strategy/structure	.44**	.43**	.43**	.42**	.43**	.42**
Structure/charter	-.36*	-.39**	-.39**	-.39**	-.38**	-.39**
Structure/number sites	NS	.30*	.35**	.34**	.34*	.34**
Structure/geographical dispersion	NS	NS	NS	NS	NS	NS
Structure/number employees	NS	.36*	.24^{s}	.25^{s}	.24^{s}	.24^{s}
Structure/sales	NS	.41**	.38**	.38**	.39**	.39**
Structure/capital employed	NA	.33*	.31*	.31*	.32*	.33*
Structure/difficulty of supply	.32*	NA	-.31^{s}	-.31^{s}	-.22^{s}	-.32*

NA: Not applicable.
NS: Not statistically significant.
^{s}Strongly suggested at the .10 level.
*Significant at the .05 level
**Significant at the .01 level
***Significant at the .001 level

TABLE 4 (continued)
Strategy and Structure Related First Order Partial Correlation Coefficients

	Controlling for:								
	% Sales to Wholesalers[a]	*% Sales to Industry & Government*	*% Sales to General Public*	*% Sales to Retailers*	*% Sales to 5 Largest Customers*	*Dependence on Largest 10 Customers*	*Market Share (1st Market)*	*Market Rank (1st Market)*	*Zero Order Coefficient (Kendall's)*
Strategy/ structure	.41*	.45*	.46*	.44*	.49*	.46*	.45*	.45*	.36***
Structure/ charter	NS	NS	NS	NS	NS	NS	NS	NS	–.36***
Structure/ number sites	.36^s	.36^s	.34^s	NS	NS	.35^s	.35^s	.35^s	.35***
Structure/ geographical dispersion	NS	NS	NS	NS	NS	NS	NS	NS	.24**
Structure/ number employees	.34^s	.33^s	.35^s	.39^s	NS	.35^s	.34^s	.35^s	.33***
Structure/sales	.38^s	.37^s	.38^s	.39^s	NS	.40^s	.39^s	.38^s	.24**
Structure/ capital employed	.47*	.44*	.43*	.42*	.39^s	.44*	.42*	.43*	.19*
Structure/ difficulty of supply	–.33^s	–.33^s	NS	NS	–.35^s	NS	NS	NS	–.22*

[a] Percent of sales to wholesalers is correlated significantly at the .01 level with structure ($r = .4160$) and not quite significantly $.05 < p < .1$ with strategy ($r = .2199$).

NS: Not statistically significant.

^{s}Strongly suggested at the .10 level.

*Significant at the .05 level

**Significant at the .01 level

***Significant at the .001 level

Existence of such strong correlations between other variables and structure, although expected from the research of organizational behavioralists quoted earlier, clearly puts the strategy-structure link into perspective. These other linkages with structure remained statistically significant when the main sample was subdivided on the basis of categories of strategy, charter, and high or low levels of environmental pressure (to be discussed later). However, because the correlates of structure other than strategy are intercorrelated, some of the first order partial coefficients are insignificant (see Table 4).

The null forms of Hypotheses H.3.2, H.4.1, and H.4.2 may therefore be rejected. Structure is closely related to sales and charter and, via these, to the number of operating sites, their geographical dispersion, capital employed, and number of employees. The analysis provides no support, however, for Hypothesis H.3.1 to the effect that size and degree of diversification are positively correlated.

Fit and Environmental Pressures

The fifth set of hypotheses stems from two related assumptions made by the strategy/structure school. The first is that certain kinds of combinations of structure and strategy, e.g., product divisional structures and related or unrelated strategies, permit companies to cope better with both external pressures and complexity generated internal pressures. The second is that external pressures force diversified companies to move to the more "appropriate" divisional structures. This argument remains strong despite the fact that Rumelt (1974) found no statistically significant difference in performance between product divisional and nondivisional related product companies.

Five scales were developed for environmental pressure or hostility perceived by interviewees. NSTP, the number of sources of important adverse impacts on the market for the companies' three most important product lines in the previous three years, measures past market turbulence. Highly correlated with this (see Table 5) is the number of expected sources of such adverse market turbulence in the next three years, NSTE. Expectations were obviously conditioned by perceptions on past experience. NSTP was also positively correlated, although not significantly, with the perceived NEED for new product innovation. This 5-point ordinal scale ranges from not worthwhile to essential for survival and may be taken as a rough proxy for the degree of new product competition in the company's major markets. NEED is highly significantly and positively correlated with a Likert-type scale measuring the perceived rate of technological change in the industry. The final ordinal scale measuring environmental pressures is based on interviewees' perceptions of the difficulty of obtaining alternative supplies of raw materials and brought-in components. This is uncorrelated with any of the others. There is no reason to have expected that it would be.

TABLE
Nonparametric
(Kendall's tau with

	Difficulty of Alternative Supplies	*Rate of Technological Change*	*Number of Sources of Past Market Turbulence (NSTP)*	*Number of Sources of Expected Market Turbulence (NSTE)*	*Need for Product Innovation*	*Share of Most Important Market*
Strategy	NS	NS	.14[s]	.14[s]	NS	NS
Structure	-.22*	NS	NS	NS	NS	NS
Charter	NS	NS	NS	-.16[s]	.18*	NS
Number of sites	NS	NS	NS	NS	NS	NS
Dispersion of sites	NS	NS	NS	NS	NS	NS
Net capital employed in 1973	NS	.14[s]	NS	NS	NS	NS
Sales in 1973	NS	NS	NS	NS	NS	NS
Number employed in 1973	.19*	NS	-.17[s]	NS	NS	NS
Difficulty of alternative supplies	NA	NS	NS	NS	NS	NS
Rate of technological change		NA	NS	NS	.25**	NS
NSTP			NA	.69***	.17[s]	-.39***
NSTE				NA	NS	-.35***
Need for new product innovation					NA	NS
Share of most important market						NA
Rank in most important market						
% sales to 5 most important customers						
Dependence on 10 largest customers						
% sales to wholesalers						
% sales to government and industry						
% sales to general public						
% sales to retailers						

NS: Not significant.
NA: Not applicable.
[s] Strongly suggested at the .10 level.
*Significant at the .05 level
**Significant at the .01 level
***Significant at the .001 level

Competitive pressure, measured by NEED for new product innovation and the market turbulence (NSTP and NSTE), is likely to be inversely related to the market dominance of the company. Similarly, heavy dependence on a few major customers, while implying a potential threat, also may provide security against market and other environmental threats. Such dependence may be mutual when the company is a major supplier. Major customers may then seek to promote the company's stability, and new products emerge more from discussions with them than as a response to competitive pressures. Such mutual dependence may be expected to be related to both the market share of the company and its pattern of distribution. In particular, in companies where sales are mainly to government and major industrial users, and market share is high, mutual dependence is likely to be greater and competitive pressures less.

With these arguments in mind, other considerations—market share, market rank, percent sales to the 5 largest customers, perceived dependence on the 10 largest customers, and percent of sales to each of wholesalers, government, and industry, the general public, and retailers—were introduced into the analysis. Correlation coefficients are shown in Table 5. Perceived dependence on the 10 largest customers is positively correlated with market share and negatively with market rank. This suggests that market share, rank (inversely), and dependence on largest customers might be treated together as a cluster of variables expected to reduce the hostility of environmental pressures. Dependence is itself related to the type of distribution pattern adopted, this being almost necessarily so. Percentage of total sales to government and industry was, in turn, positively and percent sales to the general public negatively correlated with market share. As hypothesized, market share was negatively correlated with both measures of perceived market turbulence, NSTP and NSTE, but neither market rank nor dependence on major customers was. Moreover, none of the variables for market power and dependence was significantly correlated with perceived NEED for new product introductions. The positive correlations between percent of sales to the general public and NSTP and NSTE could well be attributed to their common relationships with market share and might disappear when one controls for the latter. This is not so with the weak but statistically significant negative correlation between NEED and percent sales to the general public. This suggests that one strategy for reducing new product competition is to engage in direct selling to the ultimate customer. Larger companies, in terms of net capital employed and sales, tended to sell direct to the general public to a greater extent. By contrast, it was the smaller (but still large) companies in the sample that concentrated their sales on government and industry, and they tended to have a higher percentage of sales to their five largest customers. Percentage of sales to government and industry or to the general public seemed to be unrelated to charter, however. Although, as expected, a higher percentage of sales of manufacturing companies tended to be to retailers.

Structure is significantly correlated with only three environmental variables. First, the negative coefficient suggests that greater difficulty of finding alternative supplies is perceived in functional than in divisionally structured organizations. Divisionally structured companies may indeed be less reliant on existing sources of supplies. Alternatively, within a divisional structure, the corporate management might well fail to perceive such potential difficulties because of greater hierarchical separation from production. However, difficulties of finding alternative supplies were also perceived to be greater as the number of employees rose, and it is well established that vertical span and company size are positively correlated (Pugh et al., 1968, 1969; Child, 1972; Reimann, 1973). Second, the percentage of sales to retailers was significantly, negatively correlated with structure. However, partial correlation, controlling for charter, reduces the coefficient to a statistically insignificant level, suggesting that the apparent relationship could be due to a common dependence on this third variable. The positive correlation between percentage of sales to wholesalers and structure is less easily explained.

From Table 5 it may be seen that, of the environmental variables, only the rank of the company in its most important market and perceived dependence on its 10 largest customers are significantly correlated with strategy. The coefficients are consistent with the argument that for some, diversification may be a means of obtaining growth not possible by continued concentration on the major line of business and for others, it is a means of reducing dependence on external trading partners.

Even the significant correlations between the environmental variables and each of structure and strategy were too weak to account for much of the variance. Had they been strong, however, the validity of the fifth set of hypotheses would have been in doubt, for monotonic relationships over the entire range of these variables would have been inferred, which would have been unlikely if a match between the variables rather than their individual values is the dominant factor. Tests of the relationship between match between strategy and structure and environmental variables proceeded in two directions. First the total sample of 48 companies was divided into subsamples on the basis of strategy, structure, and high and low values of each of the eleven most general measures of perceived environmental pressure, market strength, and distribution.

Results of nonparametric correlation analysis undertaken for each are shown in Tables 6 and 7. These show clearly that match between strategy and structure is related to perceived environmental pressure. Single and dominant product companies perceive less past and expected sources of adverse impacts on their major markets when functionally or geographically organized than when product divisionalized. Similarly, companies with related or unrelated product strategies perceive *less* sources of such past and expected market turbulence and less need for new product innovation when they have a product divisional rather than a functional or purely geographical divisional structure. Also, for functionally and geographically structured companies, strategy and NSTP, NSTE, and

TABLE 6
Correlations with Environmental Variables for Different Subsamples

Basis of Sample	*Correlate*	*Difficulty of Supply*	*Rate of Technological Change*	*NSTP*	*NSTE*	*Need for New Products*	*Market Share in 1st Market*
Strategy (single and dominant products)	Structure	NS	NS	.34*	.31*	NS	NS
Strategy (related and unrelated products)	Structure	–.32*	NS	–.26*	–.18^s	–.24*	NS
Structure: Functional	Strategy	NS	NS	.56***	.52**	.41**	NS
Functional or geographic		NS	NS	.47**	.45**	.33**	NS
Product divisional		NS	NS	Negative but NS	Negative but NS	NS	NS
Product and geographical		NS	NS	Negative but NS	Negative but NS	–.58***	.56*

Basis of Sample	*Market Rank in 1st Market*	*% Sales to 5 Largest Customers*	*Dependence on 10 Largest Customers*	*% Sales to Wholesalers*	*% Sales to Government and Industry*	*% Sales to General Public*	*% Sales to Retailers*
Strategy (single and dominant products)	NS	–.63**	–.34^s	NS	–.46*	NS	NS
Strategy (related and unrelated products)	NS	NS	NS	.24*	NS	NS	–.34**
Structure: Functional	NS	NS	NS	NS	NS	NS	NS
Functional or geographic	NS	NS	NS	.23^s	–.30*	NS	NS
Product divisional	NS	.57**	.30^s	–.47^s	NS	–.35*	NS
Product and geographical	NS	NS	.56*	NS	NS	NS	NS

NS: Not significant.
^{s}Strongly suggested at .10 level.
*Significant at the .05 level
**Significant at the .01 level
***Significant at the .001 level

NEED for new product innovation are positively correlated, but for NEED the relationship becomes negative for product and geographically organized companies.

In view of the relationships already established among market share, NSTP, and NSTE, it was anticipated that similar results would be obtained when market strength was included in the analysis. However,

TABLE 7

Effects of Division into Environmentally Based Subsamples on the Correlation between Strategy and Structure

Basis of Sample Division		*Correlation Between Strategy and Structure*	*Significance Level*
Number of sources of past market turbulence (NSTP)	High	.26	.208
	Low	.43	.001
Number of sources of expected market turbulence (NSTE)	High	.41	.159[a]
	Low	.38	.001
NEED for new product innovation	High	.03	.428
	Low	.53	.001
Rate of technological change	High	.41	.011
	Low	.38	.002
Share of most important market[b]	Low (≤30%)	.44	.013
	High (>30%)	.47	.014
Rank of most important market[b]	(>1)	.58	.010
	(=1)	.37	.037
% sales to 5 most important customers	(>30%)	.76	.015
	(≤30%)	.39	.006
Dependence on 10 largest customers	High	.51	.016
	Low	.44	.009
Sales to wholesalers	(<30%)	.42	.010
	(20% < sales ≤ 40%)	.65	.030
	(>40%)	.00	.500
Sales to industry and government	(≤20%)	.37	.070
	(20% < sales ≤ 60%)	.34	.228
	(>60%)	.59	.002
Sales direct to public	(=0)	.46	.009
	(10% < sales ≤ 20%)	.30	.233
	(sales > 30%)	.50	.124

[a] This correlation is insignificant because of the relatively small sample size.

[b] The analysis for second and third markets was no different in results.

market share was correlated significantly with degree of diversification only among companies with a product and geographical divisional structure (Table 6). This suggests that a stronger market share was associated with a better fit between strategy and structure for this subsample, a relationship consistent with the lower need for new products they then tended to perceive, but it is disappointing that significant correlations were not found for other subcategories of structure and strategy.

Significant correlations for the variables for dependence and distribution channels cast further light on the possible sources of environmental pressures. Among undiversified companies, those functionally structured tend to be mutually dependent on their major industrial customers, with the resulting market stability but potential threat; but divisionally structured ones are not. Adoption of divisional structures among such undiversified companies may possibly be related to efforts to break such dependence. On the other hand the coefficients for companies with product or product and geographical divisions suggest that diversification had not tended to reduce such dependence.

Again from Table 7 it may be seen that the correlation between strategy and structure ceased to be statistically significant for companies with high perceived numbers of sources of past (NSTP) and expected (NSTE) market turbulence and high need for new product innovation (NEED). This is consistent with Table 6 in suggesting that a match between strategy and structure scales is associated with a perception of a less hostile external world. Correlations between strategy and structure remained statistically significant, however, when the total sample was subdivided on the basis of market share, market rank, and dependence on major customers. Moreover, the insignificant correlations for some subcategories of distribution channels were due largely to the small subsample sizes.

Direct comparison of successive points on the strategy and structure scales show, however, that these tests are still relatively crude for they rest on an assumption that a perfect correlation between the two scales would mean a perfect match. This assumption is not strictly valid. For instance, a functional organizational structure may be just as appropriate to a dominant as to a single product strategy. For this reason a new subjectively determined scale of "match" or FIT between the strategy and structure scales was devised which incorporates the assumptions implicit in the strategy/structure school (see Galbraith & Nathanson, 1978). Details may be found in Grinyer et al. (1978).

A negative correlation (Kendall's tau) was found between FIT and each of the numbers of past ($\tau = -.38$, $p < .001$) and expected ($\tau = -.31$, $p < .01$) sources of market turbulence, and the need for new product development ($\tau = -.20$, $p < .05$). Companies with a better match between strategy and structure do, then, perceive their environment as less hostile. Consistent with correlations found earlier between environmental scales, companies with a better FIT also tended to have a higher share of their most important market ($\tau = .19$, $p < .05$), a higher percentage of sales to government and industry ($\tau = .21$, $p < .05$), and greater dependence on their major customers ($\tau = .29$, $p < .05$). These further correlations may, indeed, explain in part why they experienced less market turbulence, although the coefficients are not as strong as those with NSTP and NSTE. It is suspected that the relationships are due largely to the observed tendency for companies heavily dependent on major governmental and industrial customers to be both single or dominant product and functionally organized.

These results could be interpreted as providing support for the hypothesis promoted by Galbraith and Nathanson (1978) that a match between structure and strategy facilitates coping with environmental pressures. Better coping might be expected to lead to a more sanguine view of the environment. However, the low values of the coefficients give grounds for caution. Even the most highly significant correlation explains no more than 14 percent of the variance. Other factors clearly bear upon perception of environmental turbulence and fit between strategy and structure too. Moreover, the full meaning of the ordinal scales for environmental pressure is still in doubt. The scales may measure, as intended, the impact of real environmental or other forces that affect performance. But they may also reflect type of business, remoteness of interviewee from the market place or technology because of structural type, and personal loquacity, perceptiveness, or natural optimism or pessimism. These personal factors might be safely assumed with a sample of 48 to generate merely "noise," but for small subsamples the effect of such noise could be important.

To test for the extent to which the "environmental" variables reflect forces that do indeed impact on companies' performance, they were correlated with average return on capital employed (ROI), growth in profits and ROI, and growth in capital employed, sales, and numbers employed. Perceived rate of technological change was significantly, negatively correlated with the four year average ROI, standard deviation for ROI, and four year growth of capital employed and sales. This was particularly so for manufacturing companies and for companies with a related or unrelated strategy; the former but not the latter was to be expected. Somewhat inconsistently, however, growth in ROI over the last two years tended to be higher where a high rate of technological change was perceived, perhaps suggesting that recognition was leading to better coping.

Difficulty of finding alternative sources of supply also was negatively, significantly correlated with growth of net profit, capital employed, sales, and number employed. Among companies combining manufacturing and service operations the adverse effects were extended to average and standard deviation of ROI, too, but effects on growth of ROI were favorable. If one were to place a single interpretation on the "difficulty of supply" variable, therefore, it would be that it measures a constraint on growth. The meaning to be attached to NEED for new products innovation is less clear. It was not statistically significantly related to any measure of performance for the sample as a whole but was negatively correlated with at least one of the measures of growth for most of the subcategories of companies. Yet, like the rate of technological change and difficulty of alternative supplies, it was positively correlated with the growth in ROI between 1972 and 1973 in three subsamples, especially functionally organized companies for which NEED was also negatively correlated with the standard deviation of ROI. This apparent inconsistency with respect to measures of growth possibly could be due to effects of recent actions reflecting perception of the need to introduce more new products if earlier performance is to be improved. Finally, the number of sources of past and expected market turbulence, NSTP and NSTE, respectively, can be given no clear interpretation. Significant results relating to them are inconsistent and category specific.

The analysis suggests, therefore, that the ordinal scales for perception of environmental pressures do, indeed, at least in part, reflect either forces that impact on performance or, alternatively, performance itself. Nonetheless, the very size of the coefficients, and the occasional inconsistencies between categories of companies, suggested that much of the variance in the scales must be explained by other factors.

The general weight of evidence suggests, then, but most certainly does not prove conclusively, that the null forms of the fifth set of hypotheses may be rejected. Companies with a mismatch of strategy and structure tend to perceive a greater environmental turbulence, which may in part reflect forces that have affected performance adversely. However, this is far from proving that environmental forces drive functionally organized but diversified companies into a product divisional structure.

Strategy, Structure, and Financial Performance

Strategy and structure were each correlated with the measures of performance to test the sixth set of hypotheses. To allow for possible differences between subsamples, this was done for both the full and all relevant subsamples, as may be seen from Tables 8 and 9. Further, to allow for differences that would be obscured by such analysis, pairwise comparisons of performance between strategy and structure related categories of companies also was undertaken.

Table 8 provides little support for the hypotheses that ROI and growth are positively correlated with degree of diversification (H.6.1) or that variability of ROI is negatively correlated with the latter (H.6.2). Indeed, diversification and growth are negatively correlated in most circumstances. Although only growth in net profit between 1969 and 1973 was significantly correlated with diversification (strategy) for the full sample, in all there are 18 statistically significant, negative correlations with measures of growth for the subsamples, and the nonsignificant correlations are virtually all negative. Pairwise comparison provided further support for this finding. The mean growth in net profits between 1969 and 1973 was 75 percent greater for single product than for dominant product, 49 percent greater than for related and 122 percent greater than for unrelated product companies. Although only the last difference is statistically significant, there is a probability of less than 1 in 10 that the first and second are due to chance. These figures provide no support for Hypothesis H.6.4. Related product firms tended to outperform dominant and unrelated ones, but not significantly, and were inferior to single product ones.

Nor is there evidence to support any hypothesis that companies with a divisional structure tend to outperform others in general (H.6.3). Indeed Table 9 shows that 4-year growth in both ROI and net profits is significantly, negatively correlated with the degree of divisionalization for both the full sample and many of the subsamples. However, in some of the subsamples, divisionalization is positively correlated with growth in capital employed, sales, and number of persons employed. For example, among dominant product companies, those which were not market leaders, and those with a low perceived dependence on major customers, divisionalization was positively correlated with growth in either capital employed or

TABLE 8
Correlation Coefficients for Strategy and Financial Performance (Kendall's tau)[a]

Measure:	Standard Deviation of ROI	Growth in ROI over Last Year	Growth in ROI over Last 4 Years	Growth in Capital Employed over Last 4 Years	Growth in Sales over Last 4 Years	Growth in Net Profits over Last 4 Years	Growth in Number Employed over Last 4 Years
Sample							
1. All 48 companies	NS	NS	NS	NS	NS	-.22*	NS
2. Functional structures	-.34[b]	NS	NS	NS	-.39*	NS	-.51**
3. Product and geographical structures	NS	NS	NS	-.72**	NS	-.60*	NS
4. All product divisional structures	NS	NS	NS	-.34*	NS	NS	NS
5. Service companies only	NS	NS	NS	-.70*	NS	NS	NS
6. Manufacturing companies only	NS	NS	-.38*	NS	.23[b]	-.38*	NS
7. Manufacturing and service companies	NS	.43[b]	NS	NS	NS	NS	NS
8. Low technological change	NS	NS	-.21[b]	NS	NS	-.21[b]	NS
9. High expected source of turbulence	NS	NS	-.39*	NS	NS	-.28[b]	NS
10. Low NEED for new products	NS	NS	-.38**	NS	NS	-.35**	NS
11. Up to 30% share of most important market	NS	-.25[b]	NS	NS	NS	NS	.25[b]
12. Over 30% share of most important market	NS	NS	NS	NS	NS	-.30[b]	-.31[b]
13. Not leader (rank > 1) in most important market	NS	NS	NS	NS	NS	NS	.45[b]
14. No more than 30% sales to 5 largest customers	NS	NS	NS	-.17[b]	NS	NS	NS
15. Perceived dependence on 10 largest customers (high)	NS	NS	NS	NS	-.38*	NS	-.39*
16. Perceived dependence on 10 largest customers (low)	NS	NS	NS	NS	.22[b]	-.22[b]	.35*
17. Sales to wholesalers between 20% and 40% of total	NS	NS	NS	.53[b]	NS	NS	NS
18. Sales to wholesalers greater than 40% of total	NS	NS	NS	-.59*	NS	-.46[b]	NS
19. Sales to industry and government less than 20% of total	NS	NS	NS	-.54*	NS	.37[b]	-.65**
20. Sales to industry and government between 20% and 60% of total	NS	NS	NS	.60*	NS	NS	NS
21. Sales to industry and government more than 60% of total	NS	NS	NS	-.23[b]	NS	NS	-.29*
22. No direct sales to general public	NS	NS	NS	NS	NS	-.30*	NS
23. Between 10% and 20% of sales direct to general public	NS	NS	-.60[b]	NS	NS	NS	NS

[a] Because the structural scale is ordinal and there are many tied values, Kendall's tau was used. The sample of 48 companies was subdivided successively on the basis of structure, charter (service, manufacturing and service, and manufacturing), high or low rates of technological change, number of sources of past and expected market turbulence, and need for new product innovation. Only samples for which at least one correlation coefficient was statistically significant were included. Similarly, the analysis covered all measures of performance, but they are shown in the table only where at least one coefficient was statistically significant.

NS: Not significant.

[b] Strongly suggested at the .10 level.

*Significant at the .05 level

**Significant at the .01 level

TABLE 9

Correlation Coefficients for Structure and Financial Performance (Kendall's tau)[a]

Measure:	4 Year Average ROI	Standard Deviation of ROI	Growth in ROI over Last 4 Years	Growth in Capital Employed over Last 4 Years	Growth in Sales over Last 4 Years	Growth in Net Profits over Last 4 Years	Growth in Number Employed over Last 4 Years
Sample							
1. All 48 companies	NS	NS	−.30**	NS	.16^c	−.20*	.21^c
2. Single product strategy	NS	.54^c	.60^c	NS	−.54^c	NS	NS
3. Dominant product strategy	.57*	−.39^c	−.48*	.74*	.48*	NS	NS
4. Related product strategy	NS	NS	NS	NS	NS	NS	.37*
5. Related and unrelated product strategy	NS	NS	−.26^c	NS	NS	NS	.34*
6. Low technological change	NS	NS	−.27*	NS	NS	NS	NS
7. High past sources of turbulence	NS	NS	−.50**	.29^c	.44**	−.27^c	.39*
8. High expected sources of turbulence	NS	NS	−.39*	.30^c	NS	−.28^c	.28^c
9. High NEED for new products	.41*	NS	NS	NS	.53**	NS	.35^c
10. Low NEED for new products	NS	NS	−.32*	NS	NS	−.30*	NS
11. Up to 30% share of most important market	NS	NS	−.35*	NS	NS	NS	.42*
12. Over 30% share of most important market	NS	NS	−.36*	NS	NS	−.28^c	.31^c
13. Not market leader (rank > 1) in most important market	NS	NS	−.31^c	.40*	NS	−.37*	.40^c
14. Market leader (rank = 1) in most important market	NS	NS	−.26^c	NS	NS	NS	.42**
15. More than 30% of sales to five largest customers (dependent)[b]	.71^c	.71^c	−.71^c	.71^c	NS	−.63^c	NS
16. No more than 30% of sales to five largest customers (relatively independent)	NS	NS	NS	−.26*	.26*	NS	.43**
17. Perceived dependence on 10 largest customers (high)	NS	NS	NS	NS	NS	NS	.30^c
18. Perceived dependence on 10 largest customers (low)	NS	NS	−.45**	NS	.41**	−.22^c	.41*
19. Sales to wholesalers between 20% and 40% of total	NS	NS	−.91*	NS	NS	NS	.67*
20. Sales to wholesalers more than 40% of total	NS	NS	−.60*	NS	NS	−.47^c	.71^c
21. Sales to industry and government between 20% and 60% of total	.64*	NS	.58*	NS	.58*	NS	NS
22. Between 10% and 20% of total sales direct to general public	.63^c	−.63^c	−.63^c	NS	NS	−.55^c	.91*

[a] Because the structural scale is ordinal and there are many tied values, Kendall's tau was used. The sample of 48 companies was subdivided successively on the basis of strategy, charter, high and low levels of technological change, sources of past and expected market turbulence, and need for new product innovation. Only samples for which at least one coefficient was statistically significant are included. Similarly, the analysis covered all measures of performance but they are shown only where statistically significant results were found.

[b] The sample size was here very low and not much significance can be attached to the suggested relationship.

NS: Not significant

[c] Strongly suggested at the .10 level.

*Significant at the .05 level

**Significant at the .01 level

sales and in number of employees, but even this seems to have been achieved at the expense of 4-year growth in ROI. Only among companies with between 20 percent and 60 percent of total sales to government and industry was divisionalization associated with growth in sales and in ROI over four years.

Financial Performance and Match

Results bearing on the relationship between performance and the fit between strategy and structure are mixed. There is partial support for Hypothesis H.7.1 that among functionally organized companies the degree of diversification (STRATEGY) and performance are negatively correlated. Table 8 shows significant, negative coefficients for growth in sales and number employed, but those for profitability are too small to be significant. In contrast, Hypothesis H.7.2 that degree of diversification and performance are positively correlated for companies with product divisions must be rejected. Indeed, growth in return on capital employed (ROI) and net profit are negatively correlated with diversification under most circumstances.

From Table 9 it may be seen that Hypothesis H.7.3 fares no better. None of the coefficients for single product companies is significant. For dominant product companies, mean ROI, variability of ROI, growth in sales, and growth in capital employed all tend to be significantly better the higher the degree of divisionalization, although growth in ROI tends to be significantly lower. It could well be that adoption of product divisional structures among dominant product companies marks efforts to move increasingly into related or even unrelated products and markets to escape the constraints imposed by maturity of original businesses. If this is so, it is a case of strategy following structure. This would explain the association with high growth in sales and capital employed, higher average ROI associated with dominance in mature industries, yet lower growth in ROI. Whatever the explanation, Hypothesis H.7.3 is clearly unproven for single product companies and rejected in important respects for dominant product companies.

Nor do the results support Hypothesis H.7.4 to the effect that performance and the degree of divisionalization are positively correlated among companies with "related" and "unrelated" strategies. Only growth in the number employed is significantly, positively correlated with degree of divisionalization for these subsamples, and there is a strong suggestion that growth in ROI is negatively correlated. Most of the other coefficients, including that for variability of ROI, are close to zero.

Not surprisingly, in view of the paucity of significant findings from this category related analysis, analysis of correlation between the general measure of match, FIT, and measures of performance revealed no significant results. Most coefficients, although positive, were close to zero. Match between divisional structures and diversified businesses seems to have little effect on financial performance.

Environmental Pressures, Strategy, Structure, and Financial Performance

Perhaps diversification has advantages in particularly difficult environments. This view is implicit in Hypothesis H.8.1. However, no significant correlations between diversification (STRATEGY) and any measure of performance were found among subsamples experiencing either high or low rates of technological change, and the only strongly suggested correlations were negative (see Table 8). The same is largely true of subsamples based on perceived numbers of both past and future sources of market turbulence, although diversification and growth in ROI were significantly, negatively correlated for companies expecting a turbulent market. Companies with a high perception of need for new product innovation, one proxy for competition in terms of new products in the market, again displayed no significant relationships between strategy and performance. Nor is the position in the company's most important market related to any relationship between strategy and performance. However, although growth in sales and number employed are significantly, negatively correlated with diversification among companies highly dependent on major customers, there are strong indications that the relationship is positive where dependence is low. As suggested earlier, this may well imply a greater exposure to competitive market forces and so provide some support for Hypothesis 8.1.

In general, though, there is very little evidence that diversification is associated with, let alone causes, high performance in conditions of high technological change and market turbulence. Thus the negative correlation between diversification and growth in net profits, found for the sample of 48 companies as a whole, is largely unaffected by environmental conditions. Nor, indeed, are the directions of relationships affected by the charter of companies, although the relationships are stronger and more statistically significant for manufacturing companies. Hypothesis H.8.1 cannot be supported.

A consistent pattern emerges from the significant and highly suggestive coefficients relating to structure (Table 9). More highly divisionalized companies seem to outperform others in terms of growth in sales, growth in capital employed, and number of persons employed where high market turbulence is perceived but continue to do significantly worse in terms of growth in ROI. Worse growth in net profit also is highly suggested. Growth in number employed, as well as capital employed or sales in some cases, also was found to be positively correlated with divisionalization among market leaders and those with a low dependence on major customers, less sales to wholesalers, and relatively low sales to the general public. Again this seems to have been associated with lower growth in ROI. Whether because of entry into new projects with low initial returns on investment at early stages of their life cycle, or expansion of sales at the expense of profit margins, the profit to sales ratio must have been dropping substantially in the divisionalized companies as they grew. Hypothesis

H.8.2, clearly, is valid only with respect to growth of the size of the business but not profitability.

DISCUSSION

Results of the study of strategy and structure in 48 large UK companies, summarized in Table 10, strongly support much of the earlier literature. Like Rumelt (1974) and Channon (1975), they reveal a highly statistically significant positive correlation between strategy and structure. Moreover, the relationship now has been shown to be independent of other correlates of structure, including number of sites, geographic dispersion of sites, and size in terms of sales, capital employed, and number of employees, as well as a variety of environmental factors. In addition, the study confirms Channon's (1975) conclusion that the linkage between strategy and structure is as strong among service as among manufacturing companies, but for reasons possibly peculiar to the sample of 48 UK companies was not significant among those combining manufacturing and service operations. The association between strategy and structure is put in perspective, however, by the equally strong correlations between the latter and charter (type of operation), size, number of sites and their geographic dispersion, variables that are not themselves correlated with strategy. This explains the small amount of total variance in structure attributable to its correlation with strategy.

The positive correlation found between each of vertical and lateral spans of control of the chief executive and an ordinal scale measuring divisionalization of organization structure is the first strut in a bridge between the strategy structure school and the organizational behavioralists. Pugh et al. (1968) and Child (1972) in the Aston studies and their extension had already shown vertical span and measures of bureaucracy to be positively correlated. Moreover, Grinyer and Yasai-Ardekani (1978) have recently shown that vertical and lateral span, formalization, functional specialization, and decentralization are not only intercorrelated but are all positively, significantly correlated with an ordinal scale of organizational structure similar to that used in the study reported here. Given the correlation between strategy and the ordinal scale for structure, strategy and measures of bureaucracy are likely to be positively correlated, too. This would be consistent with Chandler's (1962) argument. Decentralization of operational decision making and creation of a general office as a means of addressing the administrative problems inherent in diverse business operations perhaps inevitably involve constraining sets of procedures, role definitions, and the use of technically qualified staff. An extension of the organizational study by Grinyer and Yasai-Ardekani (1978) is being made to test for the existence of a direct link between strategy (diversification) and bureaucracy.

The study also bears upon the hypothesis advanced by Franko (1974) and Galbraith and Nathanson (1978) that a match between strategy and

TABLE 10
Summary of Tests on Hypotheses

Number	*Hypothesis*	*Result*	*Significance Level*
H.1.1	Vertical span is positively correlated with degree of divisionalization	Supported	.05
H.1.2	Lateral span is positively correlated with degree of divisionalization	Supported	.05
H.2.1	Diversification is positively correlated with degree of divisionalization	Supported	.001
H.2.2	H.2.1 is independent of other correlates of structure	Supported	.05 to .001
H.2.3	H.2.1 is independent of type of business or "charter"	Holds of manufacturing companies and service companies but not for those combining both	.001 for first two but rejected at .05 for last
H.3.1	Size of company is positively correlated with degree of diversification	Rejected	.05
H.3.2	Size of company is positively correlated with degree of divisionalization	Supported. Significance level varies between measures	.05 to .001
H.4.1	Number of sites is positively correlated with degree of divisionalization	Supported	.001
H.4.2	Geographic dispersion is positively correlated with degree of divisionalization	Supported	.01
H.5.1	For "related" and "unrelated" product companies perceived environmental pressure is negatively correlated with degree of divisionalization	Supported	.05
H.5.2	For "single" and "dominant" product companies perceived environmental pressure is positively correlated with degree of divisionalization	Supported	.05
H.5.3	"Fit" between strategy and structure is negatively correlated with perceived environmental pressure	Supported	.05 to .01
H.6.1	ROI and growth are positively correlated with diversification	On contrary growth and diversification often found to be negatively correlated	.05 to .01
H.6.2	Variability of ROI negatively correlated with diversification	Not supported	.05
H.6.3	ROI and growth are greater for divisionally structured companies	Growth in ROI and net profits *negatively* correlated with divisionalization	.05 to .001
	Variability of ROI is less for divisionally organized companies	Not supported	.05
H.6.4	Related business companies have higher ROI and growth than other categories	Not supported	.05
H.6.5	Divisionalized related product companies have higher ROI and growth than other categories	Not supported	.05
H.7.1	For functionally organized companies, ROI and growth are negatively correlated with diversification	No significant results for average ROI. Confirmed for *growth* in sales and number employed.	.05 to .01
H.7.2	For product divisionally organized companies, ROI and growth are positively correlated with diversification	No significant results for ROI. Rejected for growth. Growth in each of capital employed and net profits *negatively* correlated with diversification.	.05 to .01

TABLE 10 (continued)
Summary of Tests on Hypotheses

Number	*Hypothesis*	*Result*	*Significance Level*
H.7.3	For "single" or "dominant" product companies, ROI and growth are negatively correlated with divisionalization	Not supported for single product companies. Rejected for ROI and growth in sales and capital employed among dominant product companies where positive correlations found although negative correlation for *growth* in ROI.	.05
H.7.4	For related and unrelated product companies, ROI and growth are positively correlated with divisionalization	Unsupported except for growth in number employed	.05
H.8.1	In unstable environments, ROI and growth are positively and variability of ROI is negatively correlated with diversification	Not supported	.05
H.8.2	In unstable environments, ROI and growth are positively and variability of ROI is negatively correlated with divisionalization	Confirmed for growth in sales, capital employed, and number employed. Rejected for growth in ROI where correlation is negative	.05 to .01

structure is forced by hostile environmental pressure and that an appropriate match facilitates coping. Earlier studies on strategy and structure, to which reference is made in the first section, were largely unable to explore this aspect because of their methodology. Using publicly available data, they were able to use large sample sizes, but were denied the information on perceptions of management that interviews or, less adequately, mailed questionnaires can yield. The study reported here benefits from access to management's perceptions on its environment at the cost of a smaller, but still relatively large, sample. In this respect it may be seen to be complementary to the earlier studies.

Analysis reported in earlier sections shows clearly that there is less perception of environmental hostility (as well as higher market share and greater reliance, mutual dependence, on major customers, which could reduce the likelihood of competitive market pressures) in companies where strategy and structure are matched. Moreover, the variables on environmental hostility were found to be correlated negatively with measures of performance, suggesting that they reflect real rather than imagined forces. Perception of these pressures, and their financial impact, could well induce companies with a poor match between strategy and structure to move to a better one. Consequently, the results are consistent with the proposition advanced by Franko (1974) and Galbraith and Nathanson (1978).

The results on performance may be compared usefully with those of Rumelt (1974). Because Wrigley's (1970) less detailed scale was adopted, the study cannot parallel Rumelt's analysis of the differences between, for example, dominant constrained and dominant-linked strategies. Also, the structural categories and financial variables, although similar, are different. Nevertheless, the similarities are sufficient to permit direct comparison with Rumelt's analysis of major "strategic" and "structural" categories. The results reported in the present study differ substantially. Degree of diversification and growth, particularly in net profits, were negatively correlated. In addition, diversified companies displayed no better than average return on capital employed. Moreover, single product companies had significantly higher rates of growth in net profits. It is possible, however, that the difference between the results of this UK study and Rumelt's study is due to a different distribution of related product companies between the "related-constrained" category which he found to be the best performing and "related-linked" which was average or below. This might have been revealed had a finer analysis of strategic postures been possible in the UK sample, along the lines introduced by Rumelt.

On structure, results of the present UK study are only partially consistent with Rumelt's (1974). Some categories of companies with product divisions tended to grow faster than others in terms of sales, capital employed, and number of employees, but their net profit and return on capital employed grew significantly more slowly. This is consistent with Rumelt's finding that "among product divisional firms sales growth is less closely associated with profitability than among firms with functional structures" (1974, p. 114).

Rumelt (1974) followed a pairwise analysis of strategy, structure, and performance that largely precluded him from examining the relationship between match and performance. Only in his analysis of divisionally and functionally organized related business did he touch upon the issue, and then he found that the only significant difference was in growth in sales. The study of match and performance in the present paper therefore breaks new ground. On the whole, the results are disappointing for there is little relationship between match and financial performance. Moreover, this seems to be true no matter which environmental variable is used to subdivide the sample. This casts some doubt, then, on the proposition that a good match or fit between strategy and structure promotes more effective coping with environmental pressures. It may possibly reduce the awareness of environmental turbulence without affecting performance.

Nonetheless, Galbraith and Nathanson's (1978) proposition that better match promotes coping with the environment cannot be rejected. As already seen, better match did reduce perception of environmental hostility, which in turn was related to financial performance. Moreover, the analysis of financial performance is not as strong as was wished, and it certainly is weaker than Rumelt's (1974). It was difficult to obtain measures of performance for the members of the sample that were owned subsidiaries or divisions of other companies. Consequently, a large number of values for some variables are missing, such as average ROI, the highest number being

19 for the 4-year averages. Only nine were missing for the 2-year averages of ROI. Given the sample size of 48, this reduced the number of cases for which the 4-year average and standard deviation of ROI could be analyzed to merely 29, although the number was in the region of 40 or above for other measures. Subsequent subdivision between categories of structure, strategy, charter, and other contextual variables inevitably meant that some subsamples for the average and standard deviation of ROI in particular were very small. In such subsamples the size of coefficient required for results to be statistically significant was often high with a resultant loss of results. Nevertheless, where correlations appear consistently and significantly in different subsamples (as in the case of the main relationships reported) and in the full sample, the findings are likely to be strongly indicative of real associations. Consequently, where the results on performance are contrary to those of Rumelt (1974), they should be interpreted as raising serious questions and underlining the need for further research, rather than contradicting. The basis for the analysis is still sufficiently strong to make these questions important and to suggest possible differences between the United Kingdom and the United States, although Channon (1975) obtained results for the UK service industries very similar to Rumelt's (1974).

Such reservations do not apply to the main contributions of the research: the relationship between spans of control and divisionalization; the independence of the strategy/structure linkage from other correlates of structure; and the relationship between the fit between strategy and structure and perceived environmental hostility.

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Board Power and Organizational Effectiveness Among Human Service Agencies[1]

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This study examines the importance of an externally powerful board of directors to the effectiveness (ability to attract scarce resources) of 46 human service agencies operating within the same community. Traditional assumptions regarding the importance of a powerful board were supported when effectiveness was operationalized using static measures of funding but were not supported when dynamic measures were used.

In recent years, researchers have paid considerable attention to the ways in which organizations adapt to and interact with their external environments. As part of this open system perspective, researchers have focused on a number of organizational components that act to buffer the organization from the uncertainties of its environment. One such boundary spanning component that has generated considerable interest is the board of directors.

Over the years, the boards of many different organizations have been studied from a variety of perspectives. One common theme that has emerged from this research is the importance of a board in co-opting important and potentially hostile elements in the environment of the board's parent organization. In the nonprofit sector, most human service agencies are subject to public scrutiny and must depend on the local community for resource acquisition. As a result, these agencies often attempt to attract people who are powerful, well-known, and highly involved in the community to serve on their boards of directors, thus developing what Wilensky and Lebeaux (1958) describe as a "power board." By maintaining such a power board, an agency is able to reduce uncertainty through a

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heightened awareness of the priorities and expectations of those who control community resources. As a result, the agency is likely to enhance its potential to attract scarce resources, particularly funding. This conclusion has been reached by a number of writers across a variety of different organizational settings (Wilensky & Lebeaux, 1958; Auerbach, 1961; Zald, 1969; Pfeffer, 1972, 1973). However, largely as a result of very limited growth in fund availability for most human service programs in recent years, fund sources for nonprofit human service agencies have placed an increased emphasis on demonstrated program effectiveness as a prerequisite to increases in funding. Thus, recent and future agency growth appears to be based on more objective measures of effectiveness than were used in the past. Because this recent emphasis is not necessarily consistent with the traditional role of a board of directors, this study reexamines past assumptions regarding the importance of a powerful board to an agency's effectiveness in acquiring funding.

BACKGROUND

In theory, boards function at what Parsons (1960) refers to as the "institutional" level of an organization and, as such, must contend with both internal and external contingencies. In practice, however, the role of a board tends to be more restricted because of board composition. Generally speaking, board members are selected either for their expertise and familiarity with the organization and its administrative needs or for their association and involvement with external groups and organizations with which the organization must interact if it is to survive. As a result, boards of directors have been studied from essentially two functional perspectives: the internal control function of boards and the external function of co-opting important elements of the organization's environment. Both functions are important for organizations, but the relative importance of each depends on the needs of the organization and, especially, the degree of uncertainty in its external environment. When an organization faces a highly uncertain environment, a strong emphasis tends to be placed on the external role of the board. This conclusion is supported by a number of studies of boards of directors across a variety of different types of organizations. In his study of the Oregon Fish and Game Commission, Price (1963) examined the relationship between the agency's commissioners (board members) and its staff. He noted that board members serve as buffers between the staff and the public. In this role, there was often conflict between the board and the staff regarding the internal needs of the organization. Nevertheless, commissioners were appointed not because of their support of organizational goals, but because of their social position, thus legitimizing the organization in the eyes of the public.

Zald (1967) studied the relationship between board composition and organizational effectiveness in Chicago area YMCAs. He found that although the percentage of business leaders on the board was positively correlated with financial contributions, the members of these more prestigious boards were less likely to participate in such internal functions of the agency as involvement with programs and attendance at meetings. In a later paper, Zald (1969) introduced a number of theoretical propositions that connected the power of a board in exercising control over organizational functions with the board's access to and control over scarce resources needed by the organization, particularly funding.

In his study of the boards of 80 nonfinancial institutions, Pfeffer (1972) found that board size was positively correlated with the organization's need to maintain linkages with its environment as determined by size (based on sales) and financial requirements. The relationship between board size and organizational size also was found by Allen (1974) in his study of the boards of manufacturing corporations. In addition, Pfeffer found that organizations with a high debt/equity ratio (suggesting dependence upon lenders) had a high proportion of outside directors on their board. Outside directors were persons who were never a member of the organization's own management. Thus their value to the organization was as a link to other organizations, particularly financial institutions, upon which the focal organization depended for its own resource acquisition.

In a subsequent study, Pfeffer (1973) examined the functions of hospital boards of directors. His findings showed that the environmental linkage or co-optation function of hospital boards was important for those hospitals that had to depend upon the local community for their support. For those hospitals whose funding was from religious groups or from the federal government, the administrative function of a board was more important.

The importance of the external role of a board of directors is given further although less direct support by research on the impact of environmental uncertainty on organizations and their structure. Lawrence and Lorsch (1967) found that organizational effectiveness depends upon a differentiation of activities that is consistent with environmental uncertainties. Thompson (1967) suggests that boundary spanning components tend to reflect the complexities of an organization's environment. Burns and Stalker (1961), Emery and Trist (1965), Neghandi and Reimann (1973), and Osborn and Hunt (1974) have reached similar conclusions. A generalization of these findings to boards of directors suggests that the more an organization depends on elements in its external environment and the greater the uncertainty in that environment, the more the organization will tend to diversify its board to reflect the demands and pressures of the organization's external environment. For most organizations, this means developing and maintaining a powerful board; that is, a board with strong links with the organization's external environment, particularly with those elements of the organization's environment that are most relevant for the acquisition of scarce resources such as funding. By maintaining a power board, organizations should be able to enhance their effectiveness, at least regarding fund acquisition.

The ability of an organization to acquire scarce resources has been proposed by Yuchtman and Seashore (1967) as a means of evaluating organizational effectiveness. This "system resource" approach is distinct from the goal approach to organizational effectiveness discussed by Hall (1977). The goal approach considers effectiveness to be based on how well predetermined organizational goals are met and is exemplified by the work of Etzioni (1964) and Price (1963). Molnar and Rogers (1976) suggest that use of the goal approach is most relevant when considering the effectiveness of internal organizational objectives. In contrast, the system resource approach considers effectiveness to be the ability of an organization to exploit its environment to acquire scarce and valued resources. It is based heavily on the assumption that organizational effectiveness should be measured from a macro perspective. Although this approach is still based on goals, it relies on what Perrow (1961) refers to as operative rather than official goals. Use of operative goals to measure effectiveness is consistent with the model proposed by Steers (1975) in his review of the organizational effectiveness literature, because what an organization can attain is measured rather than merely what is desired.

The principal problem associated with the system resource approach is that organizational effectiveness is based solely on resource attainment rather than on resource use. Thus, this approach ignores the goals associated with the organization's internal functioning as well as the goals associated with the organization's output. The assumption made is that an organization's internal and output goals are only important insofar as they enable an organization to acquire the resources needed for its survival. For human service agencies, this assumption is not always valid. Agencies that are highly effective in providing needed services to clients are often not able to generate increased funding due to the changing priorities of fund sources. Resource acquisition is certainly a major contributing factor in the ability of an agency to deliver quality service, but it is not necessarily an indicator of whether or not resources are being utilized effectively.

In general, any attempt to assess organizational effectiveness using either the goal approach or the system resource approach should be contingent on the relevance of that particular approach in explaining the effectiveness of the organizations being studied. The study reported here uses a system resource approach to assess organizational effectiveness. Although this approach has some shortcomings as a measure of agency effectiveness regarding the accomplishment of service related goals, it is used here because this is a study of the contribution to agency effectiveness of one particular organizational unit; namely, a powerful board of directors whose primary purpose is to facilitate the acquisition of scarce resources from the agency's external environment. Some agencies may purposely attempt to attract board members not for their potential influence in the community but for their professional expertise and for their willingness to devote their time and energies to the agency and its goals.

However, as Pfeffer (1972, 1973) has demonstrated using both business firms and hospitals, organizations generally maintain boards with this "internal" orientation to assist the organization in dealing with its internal administration. For human service agencies, a board having a strong internal orientation would be likely to be involved in such activities as working with the agency's professional staff in the evaluation of agency services. In contrast, externally powerful boards are maintained primarily to assist organizations in attracting scarce resources from their external environment. A major function of the boards of most human service agencies is to enhance their agency's capacity to influence potential fund sources (Auerbach, 1961; Zald, 1969). It thus is entirely appropriate to measure the impact of a powerful board on agency effectiveness in terms of the agency's ability to attract these scarce resources.

Most past research on boards suggests a strong positive relationship between board power and organizational effectiveness. However, the usefulness of this research has been somewhat limited because most studies only discuss the impact of a board on the actual dollar amounts of funding received by the organization or on the proportion of total funding received from different sources. These static measures of effectiveness are not able to show the contribution of an agency's board to its financial growth. In addition, few studies of boards have explicitly discussed board-environment linkages in terms of board power, except in theory.

This study explores the impact of a powerful board of directors on the effectiveness of human service agencies regarding the ability of these agencies to acquire scarce funding. Organizational effectiveness is operationalized here using both static and dynamic measures of funding so that the impact of a powerful board on an agency can be assessed not only in terms of its ability to attract large amounts of resources during any one period (static measures) but in terms of its ability to increase its resources over time (dynamic measures). Specifically, static measures of effectiveness include a 3-year average (1974-1976) of the absolute amount an agency received from United Way, from non-United Way sources (excluding bequests), and from bequests. Dynamic measures of effectiveness include the percentage increase in the agency's United Way funding and the percentage increase in the agency's non-United Way funding. Each of these dynamic measures was calculated yearly over a 3-year period (1974-1976). To smooth out any unusual year-to-year fluctuations the means of these three year figures were used.

Using this multivariate approach to the measurement of effectiveness, the following research questions are addressed: (a) What is the relationship between board power and organizational effectiveness? (b) Is this relationship consistent when using either static or dynamic measures of effectiveness? (c) Does the impact of a powerful board on fund acquisition vary depending on the source of funding?

METHOD

The organizations studied were 46 nonprofit human service agencies providing health, social welfare, character building and/or recreational services to their clients. All of these agencies were located in or near the same large, industrial city in the northeastern United States and all were formally affiliated with the local United Way. By restricting the sample to those agencies affiliated with United Way, the impact of a powerful board on an agency's effectiveness can be assessed considering one extremely important source of local funding that is common to all. Although there is considerable variation in the extent to which agencies are financially dependent on United Way, United Way is a potential funding source for all of its affiliated agencies.

At the time of data collection, 66 agencies were affiliated with United Way. However, many of these agencies were not considered for the purposes of this study, either because the agency received no funding from United Way or because the agency was physically located outside of the community being studied. Data were not obtainable for two agencies. The data used in the study were collected either directly from United Way records, from the executive directors of the agencies, or from published sources available to the public.

The measures used to operationalize agency board power are listed in Table 1. Each of these is felt to be a measure of the extent to which an agency's board is linked with those elements of its environment that are likely to be important to the agency in acquiring funding. Because all of the human service agencies studied received at least a substantial part of their funding from local sources (United Way, local government, clients, etc.), emphasis was placed on measures that reflected a recognition of the importance of maintaining links with local groups having the potential to influence community decisions. This approach is consistent with that of Perrucci and Pilisuk (1970) in their discussion of the community power of organizations. The means and standard deviations of these six objective measures of board power indicate the characteristics and composition of the boards being studied.

TABLE 1
Measures of Agency Board Power

	Mean	*Standard Deviation*
Board prestige scale (interitem $r=.59$)		
a) percent listed in Social Register	7%	.11
b) percent living in high income areas[a]	49%	.27
Board linkage scale (interitem $r=.63$)		
a) links with other human service agencies	3.3 links	4.90
b) links with United Way's board	.5 links	.84
Board size	28.9 members	17.00
Percent males on board	69%	.24

[a] Census tracts with a mean family income of at least $15,000 per year in 1970 (5 census tracts of a total of 220 from the metropolitan area surveyed).

The first two variables used to operationalize board power are measures of board prestige. Several writers have discussed the importance to an organization of attracting board members with high prestige in the community. Although agency board members are generally no longer expected to fund the agency out of their own pockets, the community prestige and importance of board members still appears to be important as a means of generating agency funding. Auerbach (1961) suggests that agencies with more prestigious boards of directors are more likely to receive favorable budget hearings from local funding sources (especially United Way) than agencies with low prestige boards. Zald (1969) believes this occurs because high prestige people not only tend to be well respected in the community, but they are likely to control, either directly or indirectly, significant contributions to the local community fund. They also are likely to have considerable influence with other local fund sources. In more general terms, Thompson (1967) suggests that an organization may increase its power significantly by acquiring prestige.

Board prestige is operationalized here as a 2-item scale (interitem $r = .59$) consisting of the percentage of each agency's board members listed in the city's Social Register (1973) and the percentage of each agency's board members residing in census tracts (United States Bureau of the Census, 1972) with a mean family income of at least $15,000 per year (only 5 of a total of 220 census tracts fell into this category for the entire metropolitan area surveyed). Undoubtedly, there is some variation in the degree to which each individual board member listed in the Social Register and living in a high income area is actually able to influence community decisions. Nonetheless, as indicators of past personal success, these measures of community prestige do at least provide a rough measure of the potential power of board members in the community. In addition, these measures of prestige are used here not to assess the power of any one individual board member but to assess the potential power of each agency's board as an entire unit, thus minimizing the effect of variation in power differences among members of the same board. Whether or not this potential power is eventually enacted to acquire funding will be tested in this paper.

A second group of variables used here as a measure of board power is the agency's board linkages. In their discussion of community power, Perrucci and Pilisuk formulate a general proposition regarding interorganizational relationships and power:

> ...the resources relevant to the existence of power are dispersed and reside in the interorganizational connections that may be mobilized in specific situations, particularly dealing with allocations of scarce values (1970, p. 1042).

When an agency becomes more involved with other agencies and organizations in the community, it increases its importance within the community, thus strengthening its position with local fund sources. In terms of the relationship expressed by Perrucci and Pilisuk, the greater an agency's interorganizational connections, the more it is likely to be in a position where it can mobilize power in an effort to obtain scarce resources. A major way that organizations maintain these linkages is by having a board of directors with several of its members on the board of other organizations.

Benson (1975) argues that environmental dominance depends on the types of participants who exercise power in the environment. In a community, power may be concentrated in the hands of a few powerful people, or it may be distributed among a number of organized community groups. This is the distinction between the elitist and pluralist approaches to the study of community power discussed by Perrucci and Pilisuk (1970). Regardless of which approach is used, a more extensive involvement with organizations or groups that may have influence with whatever community power groups exist would tend to be extremely important for an organization attempting to maximize its own influence in the community. As a result, agencies having many interorganizational linkages would tend to be strongly represented and highly visible among a variety of important community power groups. Taken together, these power groups have the potential to wield considerable influence in the community on behalf of an agency.

Two types of agency board linkages were considered. The first is a measure of the number of linkages between an agency's board and the boards of all other human service agencies affiliated with United Way. An agency scored on this measure each time one of its own board members was also represented on the board of another United Way agency. Thus, an agency would receive a score of 3 if one of its board members was on three different United Way agency boards, if three of its board members were each on the board of one other agency, or if there were some combination of the above criteria. Although many board members were on the boards of other organizations (both public and private) besides United Way agencies, only linkages with United Way member agencies were considered due to the difficulty in obtaining complete data for linkages outside the United Way system. Although highly correlated ($r = .82$), the actual number of linkages was utilized rather than considering the proportion of an agency's board members on the boards of other agencies. By using the actual number of linkages, it is possible to measure the extent to which an agency's presence is felt by other agencies, United Way, and the community as a whole.

The second measure of an agency's board linkages is the number of board members also on the board of United Way. This is a direct form of agency co-optation of a potential adversary. Allen (1974) argues that interorganizational co-optation in the form of interlocking boards of directors represents a strategy of coping with environmental uncertainties, especially regarding potentially harmful and unilateral actions by other organizations. Any overlap in the board membership of an agency and United Way (co-optation) would tend to reduce environmental uncertainties for an agency as well as to enhance its capacity to influence United Way decisions. Agency board members on the board of United Way would be likely to support decisions favorable to the agency and would help to defeat propositions that might be detrimental to agency stability or growth, especially funding decisions. As with interagency board participation, the actual number of an agency's board members on United Way's board is the crucial measure, not the proportion of its board members on United Way's board. The more voices heard in support of an agency, the more the agency will be likely to influence United Way. In any event, these two measures of co-optation are high correlated ($r = .90$). For purposes of analysis, links with other human service agencies and links with United Way's board were combined into one measure entitled board linkages (interitem $r = .63$).

The arguments developed to justify use of agency board linkages apply also to board size. The importance of a large board for fund acquisition has been demonstrated by Pfeffer (1972, 1973) for business organizations and for hospitals. Board size should be important to a human service agency that must appeal to the local community for funding. A large board means more visibility in the community as well as a greater pool of potential agency supporters. An agency with many board members would be likely to understand the needs and demands of a wide variety of community interest groups and thus would be more able to exploit these groups to meet its own financial needs.

The final measure of agency board power is the percentage of male board members. Babchuk, Marsey, and Gordon (1960), in their study of the board of voluntary organizations in a middle-sized community, found that women were more likely to be on the boards of smaller organizations with less community prestige than were men. Zald (1969) hypothesizes that women on boards have less influence than men because they generally have less command of scarce resources, rarely represent major bureaucratic organizations, and are socialized to more passive role taking. Based on these conclusions, the proportion of males on an agency's board is used here as the final measure of board power.

The validity of using the variables presented thus far as operationalizations of board power was tested statistically by correlating each of these objective measures with a perceived measure of board power (see Table 2). Perceived power was operationalized by asking each agency executive director to list the seven United Way agencies which he or she felt had boards of directors with the most influence in the community. A score was then assigned to each agency based on the number of times the agency was mentioned by all agency executives. Scores ranged from 0 (18 agencies) to 38 (American Red Cross). The generally strong, positive correlations shown in Table 2 lend considerable statistical support to the conceptual argument that the objective variables used here are valid measures of board power.

FINDINGS

The findings reported in Table 3 lend strong support to the contention that a powerful board is important for agency effectiveness. As indicated by the statistically significant multiple correlations, when considered collectively, the board power measures used here are strong predictors of the

TABLE 2
Correlation Matrix of Measures of Board Power
($N=46$)

	1	*2*	*3*	*4*
1. Board prestige				
2. Board linkages	.50**			
3. Board size	.25*	.65**		
4. Percent males on board	.07	.15	-.01	
5. (Perceived board power)	.45**	.75**	.77**	.10

*$p\leq.05$
**$p\leq.01$

TABLE 3
Standardized Regression Coefficients (and Zero-Order Correlations) for Relationships Between Static Measures of Effectiveness and Measures of Board Power
($N=46$)

		Static Measures of Effectiveness		
Measures of Board Power		*United Way Funding*[a]	*Non-United Way Funding*[a]	*Bequests*[a]
Board prestige	beta	.03	.21	.28*
	r	(.34***)	(.44***)	(.40***)
Board linkages	beta	.35**	.34*	.29
	r	(.71***)	(.61***)	(.35***)
Board size	beta	.54***	.25	-.15
	r	(.77***)	(.52***)	(.11)
Percent males on board	beta	.02	.04	.12
	r	(.07)	(.10)	(.18)
Multiple *R*		.82***	.66***	.47***
R^2		.67	.43	.22

[a] 3-year average (1974-1976).
*$p\leq.10$
**$p\leq.05$
***$p\leq.01$

absolute amounts of funding received from United Way, from non-United Way sources, and from bequests. As a result of increased competition from other human service agencies as well as a general tightening in the availability of funding for most human services in recent years, powerful board members seem important for an agency because they can be called upon by the agency's administrators to use their influence with fund sources either directly or indirectly.

When effectiveness is measured in terms of the amount of funding received from United Way, the multiple correlations are strongest. This finding is not surprising considering that the board power measures used here are essentially measures of local community power. United Way only collects funds locally and thus is highly responsive to the demands of local power groups. The strongest individual predictors of United Way funding are board size and the number of board linkages. These findings suggest that to obtain large amounts of United Way funding it is important for an agency to be represented throughout the community. By such representation the agency is likely to increase its local base of support and thus be more capable of influencing United Way.

None of the four individual board power measures emerged as a strong predictor of non-United Way funding. Rather, board prestige, board linkages, and board size all contributed to the overall importance of board power as a strong predictor of non-United Way funding (multiple $R = .66$, $p \leq .01$). The strongest single beta weight was for board linkages (beta= .34, $p \leq .10$), indicating the importance of this measure as a predictor of agency funding from both United Way and non-United Way sources.

The strongest single predictor of agency bequests was board prestige. This finding is not surprising. It would be expected that board members living in high income areas and listed in the Social Register would have wealth to leave behind after their death. A surprising finding is the modest negative relationship between bequests and board size (beta = -.15) suggesting that an agency attempting to generate bequest money should be less concerned with attracting a large number of board members than with being selective in its choices.

Finally, it is apparent that the percent of males on an agency's board has little relevance to its ability to attract large amounts of funding from any of the three sources discussed here. This in itself tends to refute the conclusions made by Babchuk et al. (1960) and Zald (1969) by implying that the traditional assumptions about the power of women (or lack of it) in organizational contexts may no longer be valid, at least regarding the boards of human service agencies.

Table 4 shows the relationship between board power and the two dynamic measures of effectiveness. Although less commonly used, dynamic measures are important when evaluating organizational effectiveness. Through their use, changes in an organization's ability to acquire scarce resources can be assessed. When considered along with important static measures of effectiveness, a more complete picture of the overall effectiveness of an organization can be seen than when either of these approaches is used individually. The importance of considering both types of measures is made apparent by contrasting the findings shown in Table 3 with the findings reported in Table 4. Although board power was found to be a strong predictor of all static measures of effectiveness, the multiple correlations shown in Table 4 are not statistically significant for either of the two dynamic measures. Although a powerful board may be important for an agency in terms of its obtaining high funding, it has little importance as a means of enabling an agency to increase its funding from either United Way or from other, non-United Way sources. These conclusions vary little when total agency budget size is used as a control variable (not shown), implying that agencies with little total funding are no more able to increase their funding than are their larger counterparts.

In regard to these dynamic measures of effectiveness, it is noted that the zero-order correlatinos and beta weights expressing the relationship

TABLE 4
Standardized Regression Coefficients (and Zero-Order Correlations) for Relationships Between Dynamic Measures of Effectiveness and Measures of Board Power
($N = 46$)

		Dynamic Measures of Effectiveness	
Measures of Board Power		*% Increase in United Way Funding*[a]	*% Increase in Non-United Way Funding*[a]
Board prestige	beta	-.01	-.26
	r	(-.14)	(-.23*)
Board linkages	beta	-.32	-.02
	r	(-.26**)	(-.05)
Board size	beta	.11	.17
	r	(-.10)	(.09)
Percent males on board	beta	-.05	-.01
	r	(-.10)	(-.03)
Multiple *R*		.28	.28
R^2		.08	.08

[a] 3-year average (1974-1976).
*$p \leq .10$
**$p \leq .05$

between all but one of the board power measures and the percentage increase in both United Way and non-United Way funding are in a negative direction. Two of these negative zero-order correlations (but none of the beta weights) are statistically significant. When considered together, these findings suggest that agencies with powerful boards of directors may actually be somewhat less effective in increasing their funding from all important fund sources than are agencies with relatively weak boards. One possible explanation of these findings is suggested by an examination of Table 5. The executive director of each agency was asked to respond to the following question: "In carrying out your job, how much support do you receive from your board of directors?" Responses were scored on a Likert-type scale ranging from 1 ("much less support than I need") to 5 ("all the support I need"). Although only one finding was statistically significant, all results were in a negative direction, suggesting that in

TABLE 5
Pearson Correlation Coefficients of Measures of Board Power with Board Support of the Agency's Executive Director
($N = 46$)

	Measure of Board Power			
	Board Prestige	*Board Linkages*	*Board Size*	*Percent Males on Board*
Support of the agency's executive director by the board	-.12	-.19*	-.10	-.07

*$p \leq .10$

performing their jobs the executive directors of agencies with powerful boards appear to be getting somewhat less support than are the executives of agencies with less powerful boards. This finding is not surprising in light of the high level of involvement in a variety of community and business activities which is characteristic of the members of a powerful board. Any general lack of support by its board could well affect an agency in interpreting and responding to community needs as well as to the shifting priorities of fund sources.

However, although Tables 4 and 5 do suggest that a powerful board may be of little help to an agency, the generally negative findings are not really strong enough to conclude that a powerful board actually hinders an agency in its attempts to increase its funding. A more likely explanation of the major results reported in Tables 3 and 4 is that the presence of a powerful board indicates the concern of an agency with long-term resource maintenance and protection, even at the expense of short-term growth. This concern would be especially important for large, older agencies because they have considerable resources to protect and are often less flexible in their capacity to alter their usually well-established programs to meet the changing priorities of fund sources. Table 6 indicates that large (based on a number of dimensions), older agencies do tend to have powerful boards of directors. One explanation of the mixed results reported in this study is that these large, well-established agencies maintain powerful boards primarily to minimize the possibility of any arbitrary community actions or decisions detrimental to the needs of the agency and to protect the agency's considerable resources in time of crisis.

TABLE 6
Pearson Correlation Coefficients of Measures of Board Power with Various Agency Characteristics
($N=46$)

	Agency Characteristics			
Measures of Board Power	*Agency Age*	*Number of Employees*	*Number of Volunteers*[a]	*Number of Clients*
Board prestige	.56**	.47**	.05	.12
Board linkages	.39**	.60**	.37**	.58**
Board size	.27*	.49**	.50**	.71**
Percent males on board	-.04	.10	-.11	-.05

[a]Does not include board members.
*$p \leq .05$
**$p \leq .01$

This interpretation is consistent with a hypothesis proposed by Zald in his theoretical discussion of boards of directors. He states:

> Examination of the functioning of a board over long periods of time would reveal an ebb and flow of board functions, importance, and power during different phases of organizational development and activity (1969, p. 107).

Thus, the role and importance of a powerful board may vary considerably depending upon such factors as the size, age, and subsequent flexibility of an agency. For the agencies studied here, board power is either not useful in increasing agency funding or was not enacted for this purpose over the time period studied. However, a powerful board may be extremely important for an agency in protecting its resources, particularly in the event of a crisis. This function would be especially crucial for large agencies having considerable resources to protect and whose flexibility to adapt quickly to shifting community priorities may be quite limited. Thus, it would appear to be important for large agencies to maintain powerful boards even though these boards may be of no help in actually increasing agency funding, at least in the short-run.

DISCUSSION

This study has examined the effectiveness of nonprofit human service agencies in terms of the ability of their boards of directors to influence sources of funding. Agencies that have been able to attract and co-opt important and influential members of the community and its power structure to serve on their boards have the potential to influence fund sources. The extent to which this potential power can actually be enacted to acquire scarce resources is a measure of the importance of a powerful board to the effectiveness of an agency.

Past studies of boards of directors have supported the contention that there is a positive relationship between board power measures (especially co-optation) and organizational effectiveness, particularly regarding fund acquisition. Too often, however, this relationship has not been examined in sufficient depth to make any meaningful conclusions regarding the importance of a powerful board for fund acquisition. Using static funding measures to operationalize effectiveness, the findings of this study support the conclusions of earlier researchers that powerful boards are important for organizational effectiveness. However, this study has also demonstrated that the use of static measures alone, even when several static measures are considered, presents a somewhat misleading picture of the contribution of a powerful board to the effectiveness of an agency.

The findings reported here clearly demonstrate that by having a "powerful" board of directors as defined by the various prestige, size, and linkage measures used in this study, an agency will be effective in terms of its ability to obtain large amounts of funding if these amounts are consistent with what has been received in recent years. Although the relative importance of any single power measure may vary depending on the source of funding, in general, board power is a strong predictor of all static measures of agency effectiveness regarding funding. However, board power has been shown to be unrelated to each of the dynamic measures of funding effectiveness used here. As a means of enabling an agency to be effective in its efforts to acquire funding, the results of this study strongly suggest that a powerful board of directors may be less important than previously believed.

For future research use of either static or dynamic measures of effectiveness alone should be used only when the operational goals of the organization or subunit clearly indicate that one or the other is appropriate. If important organizational goals are visibility and resource maintenance, then use of static measures of effectiveness may be appropriate. However, if an organization's major goal is growth, then dynamic measures should be used. For most organizations, both types of goals will be important, necessitating the use of both static and dynamic measures to assess effectiveness.

From a practical point of view, this study helps to show the usefulness of a powerful board of directors for attracting funding. Agencies that seek out the more well-known members of the community for their boards should be aware that a powerful board may not be at all helpful in fostering an agency's financial growth. If, on the other hand, an agency is in a situation in which growth is difficult, a powerful board seems likely to help maintain funding. This conclusion is especially important for agencies already receiving large allocations. These agencies have considerable resources to protect. In the face of increased competition from other agencies for limited amounts of funding, a powerful board may be especially important for an agency already receiving a large amount of funding as it may be a means of increasing the certainty that major budget cuts will be avoided.

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The Experience of Workplace Politics

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This study investigates the perceived politicization of organizational processes and their attitudes and beliefs about workplace politics. Perceived politicization is related to characteristics of respondents' jobs, their employing organizations, and demographic variables. It is proposed that perceived politicization may be one dimension of overall job satisfaction.

For many years people who work in complex organizations have talked about company politics, politicians, and political decisions. It is only comparatively recently, since the early 1960s, that explicit references to politics in the workplace have begun to appear with regularity in the organizational behavior literature. A survey of the literature undertaken as preparation for this project revealed 3 references directly on workplace politics before 1962, 5 between 1963 and 1967, 7 between 1969 and 1972, and 11 between 1973 and 1977. (Readers wishing a more detailed bibliography should contact the authors.) Most of this writing was at the conceptual and theoretical level. Only a small proportion reported on empirical studies.

There is a lack of uniformity in the ways in which different writers define organizational or workplace politics. In one category are those who define it in a "neutral" fashion as the occurrence of certain forms of behavior associated with the use of power or influence. A second group tend to define it in terms of an actor's subjectively realized intention of engaging in self-serving behaviors at the expense of others in the organization.

Within the first category there are a number of groups, as Mayes and Allen (1977) have pointed out. There are those (Harvey & Mills, 1970; Wildavsky, 1964) who see any conflict over the allocation of scarce resources as a political process. A second group (Walmsley & Zald, 1973; March, 1962) broaden the definition to include conflict over any policy decision, not just those relating to the allocation of scarce resources.

A third group (Butler, Hickson, Wilson, & Axelsson, 1977; Martin & Sims, 1956) sees the use of *any* power or influence as political.

Within the second category, those defining politics in terms of consciously self-serving behaviors, there are also a number of subdivisions. One of these sees political behavior as both self-serving and contrary to organizational effectiveness. Another sees it as the pursuit of self-interest which conflicts with the interest of any organizational member. In the first group, Batten and Swab (1965, p. 13), for example, say that "men engage in company politics because they believe that they can best achieve what they want in a devious, indirect and underhanded way." Pettigrew (1973) defines company politics as the by play that occurs when one man or group of men want to advance themselves or their ideas regardless of whether or not those ideas would help the company. Porter's (1976) definition is substantially the same, and Mayes and Allen (1977) are quite emphatic in defining politics as the use of influence for ends or means that are not sanctioned by the organization.

Burns (1961), Butler (1971), and Frost and Hayes (1977) avoid reifying the organization, viewing it as a constantly shifting set of groups and individuals seeking to impose their views of the organization's purpose on others. Typical is this definition of Frost and Hayes:

> Political behavior (is) the activities of organizational members...when they use resources to enhance or protect their share of an exchange...in ways which would be resisted, or ways in which the impact would be resisted, if recognized by the other party(ies) to the exchange (1977, p. 8).

The empirical research on workplace politics has used the "neutral" definition of politics discussed above. This research tends to be restricted almost exclusively to lateral conflicts in budget setting (Wildavsky, 1964), purchasing decisions (Strauss, 1964), or general policy setting (Pfeffer & Salancik, 1974). Those writing about workplace politics as a subjective process, involving the conscious pursuit of self-interest, have not undertaken research based on this conception.

In sharp contrast to the studies of social scientists, with their reluctance to study the subjective side of workplace politics, is the approach of the writers of organizational fiction and the journalists who analyze the workings of business and government policy makers. These writers subscribe fully to the concept of politics based on the pursuit of self-interest. Uninhibited by strictures to be "objective," they unashamedly impute all kinds of motives, schemes, and plots to the minds of their subjects. Any group of academic organization theorists gathered for a social chit-chat blithely do the same thing...as long as it is not for publication!

PURPOSE OF RESEARCH

The authors were curious about what organizational processes managers subjectively experienced as being the most pervaded by politics and how they felt about those who engage in political behaviors. They also were interested in the personal, job, and organizational variables that might affect managers' perceptions and feelings, although a comprehensive examination of these was not the primary aim of the study.

From inferences derived from related research, the authors' employment experiences, and unstructured preliminary interviews with managerial and nonmanagerial employees, a number of tentative general hypotheses were developed to guide the research. These were:

1. *Talk about "politics" and "politicians" would be common in most organizations.*

The hypothesis was based solely on preliminary interviews with managers and personal experience. No previous research has been reported on the frequency of political talk in work settings.

2. *The perception of politics would occur primarily around issues and events that were not guided by explicit policy or precedent nor derived from an obvious techno-economic rationale.*

This hypothesis is inferred from the work of March (1962), Cyert and March (1963), and others who define all nonroutine decision making as political. Although none of these authors has suggested that managers in organizations will consciously perceive the decision making process in the same way as they themselves do, it is not unreasonable to assume they would. Hence those issues and processes involving change in a context that does not permit strict cost/benefit analysis with widely shared criteria would be the most likely to be perceived as political by organizational members as well as by academics writing about organizations.

3. *Organization politicians and political actions would tend to be seen as self-serving and detrimental to organizational effectiveness.*
4. *People would believe that political astuteness is a necessary condition for advancement in organizational hierarchies.*

Again, for these two hypotheses it was necessary to fall back on the preliminary interview results and personal experience because no prior research reports on attitudes toward politics or belief systems associated with the perception of workplace politics.

5. *People who see their organizations as highly political would tend to be those at lower levels in the organization who are dissatisfied with their jobs and pessimistic about future success in their organizations. Such people would be responding as "victims" of political actions.*

If one assumes that most managers feel negatively about politics, it follows that they would not be likely to admit that they personally would consciously and willingly engage in such behavior. Conversely, it is possible to infer that those who are seen as causing dissatisfaction for an actor are likely to be seen as engaging in political behavior. From the opposite point of view, those seen as engaging in a great deal of disliked political behavior will create a sense of job dissatisfaction in the perceiver. In either case one would expect to find an association between the level of job satisfaction and the amount of workplace politics perceived. Also, because previous research (Locke, 1976) indicates that dissatisfaction is greater at lower hierarchical levels, more politics will be perceived by people at these levels. This argument is derived primarily from cognitive dissonance theory (Festinger, 1957). The perceived existence of political behavior, negative affect toward it, and high job satisfaction are not consonant cognitive states.

6. *Public sector employees would be likely to see their organizations as more political than would those in the private sector.*

This hypothesis is derived directly from the same rationale as that for Hypothesis 2 coupled with the literature on public sector organizations, e.g., Downs (1967), Warwick (1975), and Rainey, Backoff, and Levine (1976). This latter writing indicates quite clearly that decision making in public sector organizations is less susceptible to the application of techno-economic rationality. Hence the process will tend to be viewed as more political.

SAMPLE AND RESEARCH METHOD

A mailed, self-administered questionnaire was sent to North American resident graduates and current part-time MBA students of a large metropolitan Canadian business school. From a total of 590 questionnaires mailed out, 428 usable responses were returned, a 72 percent response rate. This sample was not representative of managers in general as it was heavily biased toward younger, highly educated males. There was, however, a good distribution of respondents in different types of public and private sector organizations, organizational functions, and hierarchical levels.

The questionnaire consisted of three sections. In the first section respondents were asked (a) the extent to which talk about politics was common in their organizations and the extent to which political considerations influenced 11 organizational processes such as pay determination, promotion, disciplinary penalties and interdepartmental cooperation; (b) the levels in the organization in which they considered political activities to be most prevalent; and (c) how they felt about politics in terms of their impact on organizational effectiveness, the success and effectiveness of executives in organizations, and the general effect.

In the second part of the questionnaire, respondents were asked to provide data on (a) selected demographic variables; (b) previous job experience and employment history; (c) current functional and supervisory responsibilities; (d) dimensions of their job contexts including autonomy, variety, feedback on performance, social interaction, opportunity for promotion, and overall job satisfaction; (e) organizational characteristics including size, product or service markets, and economic sector (business or government).

In the third section of the questionnaire, respondents were asked to describe an actual situation, involving either themselves or others, that was to them "a good example of workplace politics in action." In this section, 123 (31 percent) of the respondents provided usable stories, which were content analyzed for major themes by one of the investigators. The content analysis of the narratives was done independently of the analysis of the questionnaire responses to minimize coder bias.

RESULTS

The Extent of Political Talk

As anticipated, politics is the subject of much of the casual conversation that goes on over coffee breaks and lunch at work. Of all respondents, 60 percent agreed with the statements that "most casual conversation appears to be about things I would consider as workplace politics" or "it is among the more popular topics of conversation," while 35 percent agreed that "it only comes up now and then." The remaining 5 percent agreed that "it rarely or never comes up at all."

Perceived Politicization of Organizational Processes

Two approaches were taken to assessing the extent to which certain organizational processes were perceived as being pervaded by political behaviors. The first involved presenting, in the self-administered questionnaire, 11 organizational processes in which politics may play a part and asking respondents the extent (never=0; rarely=1; frequently=2; always=3) to which these processes were influenced by politics in their organizations. The second approach was the content analysis of the 132 narratives of political incidents provided by the respondents.

The scores on the 11 processes presented in the questionnaire, their relative rankings, and the results of a nonparametric analysis of variance are shown in Table 1. Although objective measures of the degree to which managerial discretion is involved in each of these processes are not at hand, it appears as if the ones that are seen as most politicized, such as interdepartmental coordination, the delegation of authority, and promotion and transfers, are those in which there are usually few established rules or standards and criteria tend to be "fuzzy" or open to great subjectivity. Those seen as least political, such as the application of personnel policies, hiring, and the application of disciplinary penalties, are those in which policies, some objective criteria, or precedents exist.

The analysis of the narratives provided by the respondents yielded 192 "political" incidents, and the results tended to support the findings from the self-administered questionnaire. Promotions, transfers, demotions, and dismissals were mentioned in 32 percent of the political incidents. These stories dealt with perceived inequities in the decisions of superiors about their subordinates. Of these, the most common theme was that of employees bypassed for promotion by someone else with "pull" with the supervisor based on friendship, although the person overlooked allegedly had superior competence.

TABLE 1
Perceived Politicization of Organizational Processes

Process	*Mean Rank*	*Mean Score*[a]	*% Always or Frequently*
Promotions and transfers	7.4	1.65	59.5
Hiring	4.7	1.03	22.5
Pay	5.4	1.21	33.1
Budget allocation	5.5	1.27	37.6
Facilities, equipment allocation	6.6	1.48	49.2
Delegation of authority	7.3	1.65	58.7
Interdepartmental coordination	7.8	1.77	68.4
Personnel policies	5.2	1.14	28.0
Disciplinary penalties	4.5	.98	21.5
Work appraisals	6.2	1.37	42.4
Grievances and complaints	5.4	1.22	31.6
Friedman 2-way ANOVA[b] $\chi^2 = 462.5$; $D.F. = 10$; $p < .001$			

[a] Scores: 0 = never, 1 = sometimes, 2 = frequently, 3 = always.

[b] All interprocess differences were significant ($p < .001$) in a Wilcoxon matched pairs signed rank test except: promotions and transfers/delegation of authority; promotions and transfers/interdepartmental coordination; hiring/personnel policies, disciplinary penalties; pay/personnel policies; budget allocation/personnel policies, work appraisals; facilities, equipment allocation/work appraisal.

The assessment of work performance was the second most common theme in the narratives, featuring in 31 percent of the incidents. The stories dealt with avoiding blame for poor work performance, fear of superiors, perceptions of superiors judging performance on hidden or uncontrollable criteria, superiors who were nonsupportive, or superiors and colleagues who spent most of their time "covering their asses" (Warwick, 1975).

Of the incidents cited, 20 percent mentioned interunit competition for authority: who should have control over special projects, new functions, or the transfer of old functions to new units. Competition for authority between superiors and subordinates featured in 17 percent of the incidents. They involved head offices trying to get control of a project or function from field offices or vice versa, subordinates trying to "end-run" superiors, subordinates resisting the orders, or influence-attempts of others. Stories about who should, or should not, have been assigned to particular tasks or projects were the subject of 14 percent of the incidents.

Locus of Political Behaviors

Both in their questionnaire responses and in their narratives, respondents indicated that they perceived the climate to be more political at higher managerial levels in the organization and less political at lower managerial and among nonmanagerial occupational groups.

Table 2 shows the extent to which respondents in each of four managerial groups (top, middle, lower, and nonmanagerial) considered the overall climate to be political within three managerial groups (senior, middle, lower) and three other occupational categories (technical–professional, clerical and white collar, production and blue collar). The two nonparametric analyses of variance presented in this table indicate that:

TABLE 2
Locus of Political Behavior by Managerial Level and Occupational Category
Means of Respondent Scores

Locus of Political Behavior[b]	*Grand Mean*	*Managerial Level of Respondents*				*K-W ANOVA*[b] χ^2
		Senior	*Middle*	*Lower*	*Nonmanagerial*	
Top management	1.22	.91	1.18	1.29	1.36	15.5** ($n=420$)
Middle management	1.07	.75	1.08	1.18	1.16	15.7** ($n=417$)
Lower management	.73	.56	.67	.84	.80	6.2* ($n=413$)
Technical and professional	.54	.49	.54	.60	.50	3.3 ($n=408$)
Clerical and white collar	.50	.61	.44	.41	.57	12.9** ($n=408$)
Production and blue collar	.18	.35	.19	.12	.11	5.9 ($n=373$)
Friedman test	354.2**	17.3*	108.6**	137.0**	106.9**	
ANOVA χ^2[c]	($n=365$)	($n=59$)	($n=107$)	($n=98$)	($n=99$)	

[a] Respondents asked the extent (always = 3; frequently = 2; rarely = 1; never = 0) to which the climate at different managerial levels and in different occupational groups is "political."

[b] Kruskal-Wallis nonparametric one-way analysis of variance.

[c] Friedman test.

*$p<.01$

**$p<.001$

a. In the respondent sample as a whole, the climate is considered to be more political at higher managerial levels and less political among lower managerial and nonmanagerial groups.

b. More senior managerial respondents viewed the climates at each managerial level to be less political than did less senior and nonmanagerial respondents. There were no significant differences between respondent groups in the extent to which they perceived the climate as political in the nonmanagerial occupational groups.

c. Within each level of respondents, the climate was seen to be more political at higher managerial levels within the organization.

Levels of management were identified in 105 of the 132 narrative cases. The most frequently mentioned level involved in the incidents was middle management (department and division managers, plant managers, etc.), featured in 42 percent of the cases. Top management (presidents, chief executive officers, vice-presidents, etc.) was mentioned in 29 percent. First-line management was identified as acting politically in 14 percent of the narratives and nonmanagerial employees in 15 percent. The difference between the narratives and the questionnaire responses, in terms of the relative politicization of upper and middle management, is believed to be attributable to the lack of knowledge of specific incidents at the top management level. The respondents were mainly at lower and middle levels in the organization.

Attitudes and Beliefs about Workplace Politics

Respondents were asked the extent to which they agreed or disagreed with 10 statements about a number of aspects of workplace politics. They included items relating to the impact of politics on organizational effectiveness, whether political organizations were "happy" ones, whether politics was played by weak or powerful executives, the locus of political activity, how common politics was in organizations, and the relationship between political astuteness and executive success.

General affect toward workplace politics was investigated with a 9-item semantic differential anchored by adjectives such as good/bad, rational/irrational, fair/unfair, and dirty/clean.

The responses to both these item sets showed a certain amount of ambivalence in the view of workplace politics held by respondents. On the one hand, over 70 percent agreed with statements to the effect that workplace politics are common, successful and powerful executives act politically, the higher one climbs in an organization the more political the climate becomes, and that one must be a good politician to get ahead. On the other hand, 68 percent indicated strong or moderate agreement with the statement that organizationally weak people play politics; 55 percent felt that organizations free of politics are happier than those in which there is a lot of politics; 55 percent felt that politics is detrimental to organizational effectiveness, and 49 percent felt that top management should attempt to get rid of politics in the organization. In terms of general affect, respondents felt that politics are generally bad, unfair, unnecessary, unhealthy, and conflictual. In short, respondents felt that workplace politics are common and inevitable, particularly at higher levels in the organization. But, while realizing this and recognizing that to be successful they may have to

TABLE 3
Responses to Statements about Workplace Politics

Statement	*Mean Score*[a]	*Standard Deviation*	*Strong or Moderate Agreement %*
(a) The existence of workplace politics is common to most organizations	1.59	.71	93.2
(b) Successful executives must be good politicians	1.75	.88	89.0
(c) The higher you go in organizations, the more political the climate becomes	1.99	1.10	76.2
(d) Only organizationally weak people play politics[b]	2.21	1.17	68.5
(e) Organizations free of politics are happier than those where there is a lot of politics	2.34	1.09	59.1
(f) You have to be political to get ahead in organizations	2.37	1.13	69.8
(g) Politics in organizations are detrimental to efficiency	2.57	1.14	55.1
(h) Top management should try to get rid of politics within the organization	2.67	1.23	48.6
(i) Politics help organizations function effectively[b]	2.76	1.13	42.1
(j) Powerful executives don't act politically[b]	3.87	1.15	15.7

[a] Score: 1—strongly agree; 2—slightly agree; 3—neither agree nor disagree; 4—slightly disagree; 5—strongly disagree.

[b] Reverse scoring.

be good at playing politics, they don't feel that this is the way that it *ought* to be.

The analysis of the narratives showed that 73 percent of the political incidents described depicted political activity as harmful to the organization as a whole, to some unit of it, or to the protagonists in the story. Fully 84 percent of the stories described some deviation from "businesslike practice" or techno-economic rationality.

Factors Influencing Perceived Politicization

It was suggested at the outset of this paper that workplace politics may best be conceived of as a state of mind rather than as an objective state. Conflicts may exist, power plays and negotiations may go on, and they may not be defined as political by some organizational members. Others may define the application of a routine bureaucratic procedure as intensely political.

The results presented above show substantial variance in the extent to which respondents view different organizational processes as politicized and in the feelings, attitudes, and beliefs about workplace politics and politicians. The primary objective of this study was not to explain this variance. It was expected that most of the explanation would lie in variables relating to the personality, cognitive processes, hopes and aspirations, and life experiences of the respondents. This was not investigated in this initial study. However, two specific hypotheses were tested.

1. *People who see their organization as highly political would tend to be at lower levels in the organization, dissatisfied with their jobs, and pessimistic about opportunities for promotion.*
2. *Public sector employees would be likely to see their organizations as more political than would those in the private sector.*

The dependent variable in the test of these hypotheses was a scale of perceived politicization formed by summing scores on the 11 organizational processes described in Table 1. This scale has a mean interitem Pearson product moment correlation of .36 and a coefficient of reliability (standardized item alpha) of .86. A high score on this scale indicates that the respondent considers the organization as highly political.

The independent variables were:

1. Seven-point items relating to overall job satisfaction, autonomy, variety, feedback on performance, social interaction on the job, and the opportunity for promotion (Hackman & Oldham, 1974).
2. Managerial level in the organization. Respondents were assigned to groups on the basis of their responses to a number of questions on job title, job description, number of levels of authority above and below, and number of people directly and indirectly supervised. Agreement between two coders on a random sample of 100 respondents was 93 percent. The categories were: top management—chief executive officers, presidents, vice-presidents, directors of government agencies;

middle management—department or division heads, functional heads below vice-president level, assistants to directors of government agencies; lower management—first line supervisors and managers; and nonmanagement—technical, sales, and professional personnel.

3. A nominal variable indicating whether the respondent was employed in a private (business) or public (federal, provincial, municipal government) organization.
4. Other variables, such as age, income, years of work experience and size of organization (number of employees), that might moderate the hypothesized relationships.

In a bivariate correlation analysis, shown in Table 4, perceived politicization was significantly ($p < .01$) but weakly associated with lower managerial level, lack of variety and autonomy in the job, low amounts of feedback, and poor opportunities for promotions. However, in a test of differences between respondents in private and public sector organizations, perceived politicization was not significantly different ($t = -1.84$, $p > .05$) between the groups.

In a stepwise multiple regression analysis, perceived politicization was regressed on all 13 variables shown in Table 4 with dummy variable coding used for managerial levels and private/public sector. Job dissatisfaction, low autonomy, and poor opportunity for promotion were the only significant ($p < .05$) regression coefficients. It was possible to account for only 11 percent of the variance in the regression sample ($n = 322$) with shrinkage to 5 percent in the hold-out, validation sample ($n = 106$). In short, a substantial amount of variance is not accounted for on the basis of these variables, and the hypothesized relationships among managerial level, private/public sector, and perceived politicization, were not supported in the multivariate analysis.

The bivariate relationship between perceived politicization and job satisfaction ($p = -.21$, $p < .001$) suggested one other hypothesis: *that viewing one's organization as political might be a source of job dissatisfaction.* Job satisfaction was regressed against the variables in Table 4, a dummy variable for private sector, and the perceived politicization scale. As expected, job variety, opportunity for promotion, and feedback on performance were the main contributors to a total explained variance of 48 percent in the validation sample. However, perceived politicization also had a significant ($p < .02$) coefficient in this regression equation, suggesting that it may be one facet of overall job satisfaction, heretofore ignored in the voluminous literature on this complex construct.

DISCUSSION

In this study, an attempt was made to develop an understanding of the meaning of workplace politics to those who work in a variety of business and government organizations. In some respects, the picture is clear. Talk about politics is common in the workplace; respondents see politics as

TABLE 4
Correlations Between Perceived Politicization and Personal, Job, and Organizational Characteristics

	Spearman Rank Order Correlations (372≤n≤428)											
	1	2	3	4	5	6	7	8	9	10	11	12
1. Politicization												
2. Managerial level	-.12*											
3. Age	.09	.47**										
4. Income	-.10	.58**	.61**									
5. Years of work experience	-.08	.54**	.86**	.69**								
6. Years present employer	-.05	.34**	.50**	.49**	.62**							
7. Job variety	-.12*	.30**	.17**	.29**	.22**	.09						
8. Job autonomy	-.19**	.28**	.20**	.33**	.28**	.15**	.47**					
9. Social interaction	-.09	.08	.04	.07	.08	.04	.28**	.24**				
10. Feedback	-.11	.13*	.03	.13*	.03	.03	.21**	.26**	.21**			
11. Job satisfaction	-.21**	.24**	.14*	.25**	.13*	.08	.47**	.39**	.29**	.36**		
12. Promotion opportunity	-.12*	-.18**	-.28**	-.13*	-.28**	-.20**	.08	.09	.16**	.15*	.29**	
13. Size of organization	.07	-.33**	-.08	-.05	-.04	.14	-.10	-.11	.00	-.10	-.08	.16**

*$p<.01$
**$p<.001$ one-tailed test

deviations from techno-economic rationality, as pervading discretionary more than other types of organizational processes, and as more prevalent among higher and middle managerial levels than among lower and nonmanagerial levels.

The narratives focused on self-serving and self-advancing behavior of which the narrators clearly disapproved. In general, the sample viewed politics and political behavior unfavorably, most of them viewing workplace politics as detrimental to organizational effectiveness. Clearly, the preference of the sample was for the Weberian dream of the ideal decision making process, impersonal and *sine ira ac studio*. However, with this preference is the belief, perhaps realistic or perhaps cynical, that executive success is contingent on political astuteness.

As previously noted, earlier writing on this subject has tended to view it from two distinct points of view. One, striving for value neutrality, has used the term to refer to any use of power, influence, or negotiating behavior that occurs within an organization. The other is based on the subjective, conscious intent on the part of one or more organizational members to gain self-interests at the expense of others.

Clearly, it does not facilitate the further development of this subject to retain such diverse definitions of its meaning. This study indicates that, although politics is viewed by the majority in the sample as a deviation from techno-economic rationality in decision making and usually involves conflict and the use of influence, it is not always viewed this way. It appears that the orderly development of this element of organizational theory would be best served if the concept of organizational politics is not used synonymously with the well-established concepts of organizational conflict, power, and influence. It should be restricted to denote *a subjective state in which organizational members perceive themselves or others as intentionally seeking selfish ends in an organizational context when such ends are opposed to those of others.*

Given this more restricted definition, future research should seek to clarify the impact of a number of variables on perceptions, attitudes, and beliefs about workplace politics and politicians. The present study provides only a beginning in providing some directions for future research and some insight into the problems and pitfalls that may be encountered. It is suggested that future research focus on the characteristics of organizational processes, the characteristics of the organizational actors, and the interactions of the two in the following manner.

Characteristics of the Process

Certain organizational processes lend themselves to being viewed as more political than others. They are processes in which managerial discretion is high and which relate to success or failure at work, relationships with superiors, and interunit lateral relations. Insofar as an individual, or others positively regarded, may not succeed to the level expected, it is convenient to believe the decisions were not rational and hence were political. To the extent that processes such as work appraisals, promotions, or transfers rest *in fact* on ill-defined, poorly known, or ambiguous criteria, such perceptions will be exacerbated. Previous writers (Thompson, 1967; Lawrence & Lorsch, 1967; Galbraith, 1977) have indicated that interunit lateral relations are the aspects of organizational integration that are most difficult to subject to routinization and techno-economic rationality. Further research should seek to define the specific characteristics of processes that influence their perception as political.

Characteristics of Perceivers

Certain functions, because of the nature of the job and the interactions with other functions, especially tend to involve people in organizational processes that might be considered political. Mintzberg (1973) and others have shown that both ambiguity and difficulty in applying techno-economic rationality in decision making increase as one moves higher up in the hierarchy. The sample in this study confirmed this by indicating that political behavior was greater at higher levels.

One of the paradoxes revealed in the study, however, was the denial of the pervasiveness of politics by executives in the top management group, even though others indicated that they think politics are more prevalent at higher levels in the organization. There are a number of possible reasons for this paradox. It may reflect the self-image of the senior executives as techno-economic rationalists and the dissonance reduction sufficient to balance their predominantly negative view of politics and politicians. On the other hand, managerial level correlates significantly with job satisfaction in total and with other job situation variables such as variety and autonomy. The top executives were a highly satisfied group who, presumably, have had many of their expectations satisfied within their organizations and have no reason to look for political explanations for their own failure to achieve desired goals.

Even within the specific managerial levels and in the context of particular organizational processes, there is substantial variation in perceived politicization, attitudes, and beliefs. Job satisfaction has been shown to be one variable related to both perceived politicization and attitudes and beliefs about politics. One cannot rule out, on the basis of the data, the possibility that perceived politicization is one component of that job satisfaction. Although not measured in this study, it would be expected that both personal experiences and the personality of the perceiver would influence perceptions, attitudes, and feelings. It would be expected that the more one came to believe, through experience or teaching, that decisions could and should be made in terms of techno-economic rationality, and the more this is coupled with a cynical belief that people always seek to benefit themselves without regard to organizational well-being, then the more politics would be seen as occurring in the workplace. Such probing of past experience and the detailed attitudinal and personality inventories that would be needed to test such hypotheses were not included in this study. They present an opportunity for future research.

In conclusion, it is hoped that this study has brought some order to a burgeoning literature on workplace politics and clearly positioned it as a subjectively experienced phenomenon. The methodological problems in studying such a subject empirically are profound. Only rarely will protagonists in political events reveal their innermost thoughts to unknown researchers. In part, this can be overcome, as was done in this project, by asking respondents to report not on their own involvement, but on the behaviors of others which they would term political. The main alternative to this approach is the use of unobtrusive measures in participant observation studies.

Aside from further research on the determinants of the subjectively experienced political climate in organizations, perhaps the most important unanswered question having to do with workplace politics is its impact on organizational decision making. Once a significant proportion of those involved in decision making come to believe that the organization's politics are the result of individuals pursuing purely selfish interests, what does this do to the quality of subsequent decisions and the way they are implemented?

Questions such as these illustrate the importance of shifting future research on workplace politics from *a priori* definitions to those with a phenomenological basis.

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A Buffering Response in Light of Variation in Core Technology, Perceived Environmental Uncertainty, and Size

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The relationships between a particular buffering response (part-time and temporary workers) and variations in core technology, perceived environmental uncertainty, and organization size were examined. A relationship was found between variations in the flexibility of core technology and the amount of buffering, but no significant relationships were found between the buffering response and either perceived environmental uncertainty or organization size.

The purpose of this research is to test Thompson's proposition that organizations seek to buffer their technical cores from environmental uncertainty by examining the relationships among one buffering method, two core technologies, perceived environmental uncertainty, and organization size. Applied research to date has taken a piecemeal approach to this proposition by investigating either the premise that organizations cope with environmental uncertainty or the premise that organizations have technical cores with supporting type mechanisms for protection. Lawrence and Lorsch's empirical analysis (1967) revealed that different configurations of organization structure were required to cope with different environmental conditions. Burns and Stalker (1961) found that successful organizations facing a stable environment tend to have "mechanistic" or highly bureaucratic structures and processes and those facing changing and uncertain environments tend to have "organic" or flexible structures and processes. Harvey (1968), utilizing Woodward's research (1965), developed classifications of core technologies and found relationships between certain characteristics of a firm's structure and the type of core technology.

The failure of these studies to investigate Thompson's total proposition can be tied to at least two reasons. First, the underlying concepts had to be more clearly defined and operationalized before hypotheses could be tested in applied settings. Because Thompson's concepts represent a sophisticated conceptualization of organizations, researchers were unable to conduct field tests until his concepts had been specifically operationalized. Second, the necessary instrument to measure environmental uncertainty had to be developed. Empiral studies by Burack (1967) and Harvey (1968) and theoretical work by Khandwalla (1975) and Jelinek (1977) have further refined and operationalized Thompson's propositions. Empirical research by Lawrence and Lorsch (1967), Duncan (1972), and Downey (1974) have provided methods of measuring perceived environmental uncertainty.

In order to accomplish the primary purpose of the present study, two additional relations must be examined. First, the relationships among technology, perceived environmental uncertainty, size, and buffering are examined. Little research has been done here (Aldrich, 1972; Child, 1974, 1975; Hall, 1977; Pfeffer & Leblebici, 1973). Furthermore, there is a lack of research regarding the relationship between perceived environmental uncertainty and buffering and between size and buffering. This study will further examine the nature of these relationships.

Second, the study tests the perceived environmental uncertainty instrument developed by Duncan (1972) and modified by Downey (1974). Downey (1974) to date is apparently the only researcher to utilize the Duncan instrument. His study examines the conceptual and methodological adequacy of the Lawrence and Lorsch (1967) and the Duncan perceived environmental uncertainty instruments. The present study provides a needed field test of the Duncan instrument.

HYPOTHESES AND DEFINITIONS

In order to accomplish the research objectives, the following hypothesis will be tested.

H.1: *The greater the use of process technology, the more the organization will seek to buffer its technical core by using part-time and temporary workers.*

The first hypothesis deals with the relationship between the type of core technology and the use of part-time and temporary workers as one buffering response. In this study, it is hypothesized that soft drink bottling firms with process core technologies will use significantly more part-time and temporary workers as one buffering response than will upholstered furniture manufacturers representing small batch or unit core technology. The underlying rationale for the greater use of the buffering response by the soft drink bottling firms is the relative high degree of automated production facilities (Bright, 1958; Burack, 1967; Emery & Marek, 1962;

Harvey, 1968; Reeves & Turner, 1972; Thompson & Bates, 1957; Udy, 1965; Van de Ven & Delbecq, 1974; Woodward, 1958, 1965). The more automated the technical core or central conversion process, the less the machines, skills, materials, and knowledge can be used for other purposes. Automated systems lack flexibility and variety and hence have less tolerance for disturbances. The input and output components of the technical core must be buffered; one method of buffering is the use of part-time and temporary workers. The soft drink bottling firms with their process core technology represent a highly automated system. The small batch or unit technical core of upholstered furniture manufacturers is far less automated.

H.2: *The greater the perceived environmental uncertainty, the more the organization will seek to buffer its technical core by using part-time and temporary workers.*

The second hypothesis deals with the relationship between perceived environmental uncertainty and the use of part-time and temporary workers as one possible buffering response. It is hypothesized that there is a positive relationship between the perceived uncertainty and the use of the buffering response (Burns & Stalker, 1961; Child, 1974, 1975; Dill, 1962; Downey, 1974; Downey, Hellriegel, & Slocum, 1975; Duncan, 1971, 1972, 1973; Harvey, 1968; Hinings, Hickson, Pennings, & Schneck, 1974; Khandwalla, 1974; Lawrence & Lorsch, 1967, 1969; Negandhi & Reimann, 1972; Pennings, 1975; Pfeffer & Leblebici, 1973). As perceived environmental uncertainty increases, there is a greater need for the organization to insure its flexibility by using coping responses. Buffering, through the use of part-time and temporary workers, is one such coping response. Thus, the greater the uncertainty, the more the organization will use part-time and temporary workers as a means of coping with the environment.

H.3: *The larger its size, the more the organization will seek to buffer its technical core by using part-time and temporary help.*

The third hypothesis deals with the relationship between organization size as measured by the number of full-time employees and the use of part-time and temporary workers as a buffering response. It is hypothesized that there is a direct relationship between these two variables. Litterer (1961, 1963) found that as organizations grow in size, they tend to add buffering activities in general to their structures. Other researchers have found that growth in size results in structural modifications and adaptations (Blau, 1970; Child, 1973; Hickson, Pugh, & Pheysey, 1969; Inkson, Pugh, & Hickson, 1970; Pugh, Hickson, Hinings, & Turner, 1968, 1969). Several studies (Bureau of National Affairs, 1974; Joray & Hulin, 1974; Prywes, 1974) provide support for a positive relationship between size and the use of the specific buffering response of part-time and temporary workers. Thus, it is assumed that, as organization size increases, organizations tend to use a greater number of part-time and temporary workers to buffer their technical cores from environmental influences.

Definitions

Part-Time and Temporary Workers—The amount of use of part-time and temporary workers for the calendar year 1976 was used as the dependent variable for this study. Four separate categories of part-time and temporary workers are used. This classification was developed by the joint efforts of the Bureau of National Affairs and the American Society for Personnel Administrators (1974).

(1) Permanent part-time: employees who work on a permanent, year-round schedule and regularly work less than a full workweek.
(2) Occasional part-time: employees who work less than a full workweek and work on an irregular schedule in accordance with organizational needs.
(3) Temporary company payroll: employees hired directly by the company to work a full workweek in positions that are not anticipated to become permanent.
(4) Temporary outside agency: individuals who are employed by an outside organization (such as Kelly Services or Manpower, Inc.) and who work for an organization for relatively short periods of time.

The use of part-time and temporary workers is viewed as a buffering, coping response whose purpose is to protect and isolate the technical core from environmental influences as suggested by Thompson (1967) and Litterer (1963).

Core Technology—The core technology is the primary or central transformation process used by the organization to convert inputs into outputs. Current thinking on technology is that the organization has a technical core as well as secondary or supportive technologies (Jelinek, 1977; Thompson, 1967). The core technology is seen as one of the major shaping factors in the organization, but supportive activities, such as purchasing, personnel, and shipping, are viewed as "intervening technologies" that surround the technical core.

Size—Many different approaches are used to define and measure size. Among these are the physical capacity of an organization, the personnel available to the organization, organizational inputs or outputs, and discretionary resources available to the organization (Kimberly, 1976). Each of these approaches illustrates clearly distinguishable aspects that may have differing theoretical significance.

In this study, *size* will refer to the average number of full-time people the organization had available to do its work during 1976. This definition represents the most commonly used approach in research. Kimberly (1976) found that more than 80 percent of the 80 studies reviewed use this measure of size in one form or another. Although the number of employees may have different substantive implications in different kinds of organizations, Kimberly asserts that these effects can be minimized by distinguishing between manufacturing and service organizations.

Perceived Environmental Uncertainty—As defined by Duncan, *environment* refers to the "totality of physical and social factors that are taken directly into consideration in the decision making behavior of individuals in the organization" (1972, p. 314). This definition permits the recognition of both an internal and external environment. The internal environment includes those relevant physical and social factors within the boundaries of the organization. The external factors are those relevant physical and social factors outside the organizational boundaries. Lawrence and Lorsch (1967), Thompson (1967), and Terreberry (1968) have suggested the need for a conceptualization of the environment that includes both internal and external elements.

Perceived environmental uncertainty, as used in this study, has three components: (1) the lack of information regarding the environmental factors associated with a given decision making situation; (2) unpredictability of the outcome of a specific decision in terms of the amount of the organization's losses if the decision was incorrect; (3) inability to assign probabilities with any degree of confidence with regard to the effect of environmental factors on the success or failure of the decision unit performing its function (Duncan, 1973).

METHOD

Sample and Setting

The convenience sample for this study consisted of 44 firms, 22 in the upholstered furniture industry and 22 in the soft drink bottling industry. These industries were selected for the study because of their distinct core technologies. The typology developed by Woodward (1958) was used to classify these industries in terms of core technology. She identified three categories: small batch or unit production, large batch or mass production, and process production. These form a scale of technical complexity, which here means the extent to which the production process is controllable and its results predictable. Process production represents the most complex. The upholstered furniture industry represents a small batch technology and the soft drink bottling industry represents continuous process technology.

Firms in the upholstered furniture industry produce complex, custom-made goods in small batches via an intermittent production process which is labor intensive and utilizes a large percentage of skilled employees. This type of core technology has great flexibility and permits the production of a wide variety of products. Firms in the soft drink bottling industry manufacture a relatively simple product via a continuous production process which is capital intensive and utilizes a large percentage of unskilled and semiskilled employees. The result is limited flexibility and limited product variability.

Factors used to classify the core technologies are those originally developed by Woodward. In each firm the researchers studied the following by observation, interviews, and collection of industry data.

1. The manufacturing process itself, analyzing the subsidiary tasks necessary to the achievement of primary objectives
2. The number and nature of the decisions that had to be taken at each level of the management hierarchy
3. The kind of cooperation required among the various members of the management team
4. The kind of control that had to be exercised by senior executives (Woodward, 1958).

Data Collection

Data were collected by a structured personal interview and questionnaire. Personal interviews with top management in the sampled firms were used to collect information about the use of part-time and temporary workers during 1976. Perceived environmental uncertainty was measured by the questionnaire developed by Duncan (1971) and modified by Downey (1974). The questionnaire was administered to decision makers who had the authority to approve the use of part-time and temporary workers.

The reliability of Duncan's perceived environmental uncertainty instrument (1971) is questionable (Downey et al., 1975). Analysis indicated that when internal reliability was used as a criteria, the Duncan instrument appeared methodologically adequate for exploratory research. However, the instrument did not meet the reliability requirements suggested by Nunnally (1967) for applied settings. Downey et al. (1975) suggest that the instrument should be used cautiously. An examination of the internal reliabilities based on the industry data for this study further confirms the findings of Downey et al. (1975) and supports the need for caution. The reliability coefficient for Duncan's subscale, lack of effect knowledge, was found to be low ($r_{kk} = .21$, furniture industry and $r_{kk} = .12$, bottling industry), which was similar to Downey et al. ($r_{kk} = .26$). The reliability coefficient for the total uncertainty scale for each industry ($r_{kk} = .50$, furniture industry and $r_{kk} = .62$, bottling industry) met Nunnally's minimum requirement for exploratory research, as did Downey et al. ($r_{kk} = .67$). Despite these limitations the instrument remains the best developed to date and is used with caution in this study.

The soft drink bottling firms are located in the Triad, North Carolina, and Southwestern and Central Virginia areas. The upholstered furniture companies are located in the High Point, North Carolina, area.

Statistical Analysis

Nonparametric statistical tests were employed to analyze the data. The rationale for their use was based on (1) the convenience sampling procedure utilized, (2) the sample size, and (3) the two distinct industries (populations) investigated. The rigid assumptions of parametric statistics such as normality and homogeneity of variances could not be met (Hollander & Wolfe, 1973; Siegel, 1965).

The amount of use of part-time and temporary manhours for the 1976 calendar year was collected for each firm included in the sample from both industries. The categorization was used primarily to ensure uniformity of the data collection. Results for each firm were standardized in order to permit comparison among firms. The total number of part-time and temporary worker manhours was divided by the total number of full-time plus part-time and temporary manhours.

RESULTS AND ANALYSIS

Table 1 shows the means and standard deviations for the variables by industry. Table 2 provides a summary of the research findings. Hypothesis 1 states that firms with process core technologies (soft drink bottlers) will use significantly more part-time and temporary workers than will firms with small batch or unit core technologies (upholstered furniture manufacturers). The Mann-Whitney *U* test is used to test the hypothesis.

TABLE 1
Descriptive Statistics for All Variables by Industry

	Mean		*Standard Deviation*		*Range*	
Variable	*Uphol. Furn.*	*Soft Drink*	*Uphol. Furn.*	*Soft Drink*	*Uphol. Furn.*	*Soft Drink*
Part-time and temporary worker usage[a]	1.74	5.4	1.71	3.77	6.61	14.18
Perceived environmental uncertainty[b]	10.90	8.66	5.25	6.42	24.61	20.47
Size[c]	147.2	72.91	134.39	44.19	445	150

[a] Measured by the total number of part-time and temporary man-hours worked in 1976. Results for each firm were standardized by dividing the number of part-time and temporary man-hours by the total number of full-time man-hours plus the total number of part-time and temporary man-hours.

[b] Measured by the score obtained on Duncan's perceived environmental uncertainty instrument (1971).

[c] Measured by the average number of employees for the 1976 calendar year.

TABLE 2
Summary of Findings

Hypothesis	*Variables*	*Test*	*Results*
One	Technology/ Buffering	Mann-Whitney *U* test	$z = 4.00^*$
Two	Uncertainty/ Buffering	Spearman Rank Correlation	
Upholstered furniture			$r_s = -.26$
Soft drink bottling			$r_s = .17$
Three	Size/ Buffering	Spearman Rank Correlation	
Upholstered furniture			$r_s = -.40$
Soft drink bottling			$r_s = -.13$

$^*p < .001$

Statistical significance was found at the ($p<.001$) level (one-tailed test). Therefore, the data suggest that soft drink bottlers do in fact buffer their process technical cores with significantly more part-time and temporary workers than do upholstered furniture manufacturers with their small batch or unit technical cores.

Statistical significance was not found when the uncertainty/buffering and the size/buffering rank correlation coefficients were computed by industry. The second hypothesis predicts that the greater the perceived environmental uncertainty, the greater the use of part-time and temporary workers as one buffering response. The fact that the correlation coefficients ($r_s=-.26$ and $r_s=.17$) move in opposite directions is perplexing. The negative correlation for the upholstered furniture manufacturers indicates that their use of part-time and temporary workers decreases as perceived environmental uncertainty increases. In the soft drink bottling industry, the positive correlation suggests that there is a direct relationship between uncertainty/buffering as hypothesized.

Hypothesis 3 predicts that there is a direct relationship between size and the use of part-time and temporary workers in each industry. Statistical significance was not found. However, the direction of the correlation was negative in each industry, which suggests that the use of part-time and temporary workers decreases as size increases.

A 3×2 factorial design was established to determine relationships between the independent variables—technology, size and perceived environmental uncertainty—and the dependent variables—the amount of use of part-time and temporary workers during 1976. Sample size for this analysis is 40, 20 firms in each industry. The perceived environmental uncertainty scores for four firms (two in each industry) were missing. The Kruskal-Wallis one-way analysis of variance procedure by ranks indicated significant differences among the groups. Dunn's distribution-free multiple comparison procedure and the Mann-Whitney test determined that the only significant variable was technology. Two-tailed tests were used in this analysis because this research was considered exploratory in nature.

To utilize the above procedures, the data were divided into two groups based on Woodward's (1958) categorization of core technology. Each technology group was then divided into large and small size subgroups based on the 1972 *Census of Manufacturers*. Finally, the firms were divided into low and high uncertainty subgroups based on their perceived environmental uncertainty scores. The uncertainty scores for the firms were placed in ascending order and divided at the median. This resulted in eight independent groups. The number of firms in each group is shown in Table 3.

The Kruskal-Wallis one-way analysis of variance by ranks was used to determine if the eight groups differed in the amount of use of part-time and temporary workers. The observed value of H, the test statistic, was calculated to be 18.71. This is significant at the ($p<.05$) level. Thus, it appears that the groups differ in the amount of use of the buffering response.

TABLE 3
Number of Firms in Each Group

Upholstered Furniture				*Soft Drink Bottling*			
Small (Size 10-80)		*Large (Size 100-455)*		*Small (Size 20-54)*		*Large (Size 61-170)*	
Low Uncertainty	High Uncertainty	Low Uncertainty	High Uncertainty	Low Uncertainty	High Uncertainty	Low Uncertainty	High Uncertainty
Group I	Group II	Group III	Group IV	Group V	Group VI	Group VII	Group VIII
5	5	3	7	5	4	7	4

TABLE 4
Summary of Dunn's Comparison and Mann-Whitney U Tests

Source	*Test*	*Value*
Technology × Size × Uncertainty		
Group 1 vs Group 2	Dunn's Comparison	9.40<19.04
Group 3 vs Group 4	Dunn's Comparison	.07<20.77
Group 5 vs Group 6	Dunn's Comparison	.08<20.19
Group 7 vs Group 8	Dunn's Comparison	6.04<18.87
Size × Uncertainty		
Groups 1+5 vs Groups 2+6	Dunn's Comparison	5.70<13.83
Groups 3+7 vs Groups 4+8	Dunn's Comparison	8.05<13.15
Technology × Uncertainty		
Groups 1+3 vs Groups 2+4	Dunn's Comparison	6.46<13.74
Groups 5+7 vs Groups 6+8	Dunn's Comparison	2.81<13.74
Technology × Size		
Groups 1+2 vs Groups 3+4	Dunn's Comparison	7.35<13.46
Groups 5+6 vs Groups 7+8	Dunn's Comparison	5.08<13.53
Size		
Groups 1+2+5+6 vs Groups 3+4+7+8	Mann-Whitney U Test	$U=144.5$
Uncertainty		
Groups 1+3+5+7 vs Groups 2+4+6+8	Mann-Whitney U Test	$U=128$
Technology		
Groups 1+2+3+4 vs Groups 5+6+7+8	Mann-Whitney U Test	$U=62.5$*

*$p<.002$

To identify the significant variables, Dunn's distribution-free multiple comparison procedure, based on Kruskal-Wallis rank sums, and the Mann-Whitney test are used. Table 4 summarizes the findings. Dunn's procedure is used to test the various combinations of the variables. No significant interaction effects were found. The Mann-Whitney U test is used to measure the main effects of each variable (the data represented two groups). The technology variable was the only one found to be significant at the ($p<.002$) level (two-tailed test). Thus, the data suggest that technology affects the use of part-time and temporary workers.

Although significance was not found among the other variables, size still may be a factor. Table 5 presents the usage means of large and small firms in each industry. Inspection of the data shown in this table suggest

TABLE 5
Usage Means of Large and Small Firms by Industry[a]

Upholstered Furniture		*Soft Drink Bottling*	
Small	*Large*	*Small*	*Large*
2.52	.96	6.61	4.24

[a]Visual inspection of the data suggests that there may be differences between large and small firms. No statistical tests were employed. Results should be interpreted cautiously.

that there is a difference between large and small firms. In both industries, large firms use less part-time and temporary workers than do small firms. However, only visual inspection can be used to suggest some type of effect due to size.

DISCUSSION

Core Technology

This study suggests that the core technology influences the use of part-time and temporary workers as one buffering response. Soft drink bottling firms employ a process core technology and use significantly more part-time and temporary workers (the buffering response) than do upholstered furniture manufacturers, which employ a small batch or unit core technology. Process technology may be defined as a highly automated operation possessing little flexibility. As a result, the process is less tolerant of variations in the input and output components and products are highly standardized. Therefore, it is more critical that such automated systems be buffered from fluctuations in their environments.

The findings lend support to the contingency theory of organization design—i.e., there is no one best way to organize. The research findings demonstrate that significant differences exist in the usage patterns of the buffering responses between firms with process and those with small batch or unit technical cores. The data presented here indicate that the use of part-time and temporary workers as one buffering response is more suited to organizations having a process core technology than to those with small batch or unit cores.

Perceived Environmental Uncertainty

This study fails to show any statistically significant relationship between perceived environmental uncertainty and the use of the buffering response. One possible explanation for the results may be attributed to the perceived environmental uncertainty instrument. As discussed previously, the reliability of the instrument is questionable. Downey et al. (1975) suggest that the instrument should be used cautiously. The internal reliability findings of the present study support this recommendation. Downey's

(1974) study, which attempted to test the adequacy of the Duncan (1971, 1972, 1973) and the Lawrence and Lorsch (1967, 1969) perceived environmental uncertainty instruments included a sample of 51 division managers from a large U.S. conglomerate. Because the respondents were from the same company, the sample was perhaps more homogeneous than that of the present study.

Analysis of the responses to the perceived environmental uncertainty instrument does provide some understanding of the uncertainty/buffering relationship and does suggest directions for future research. The perceived environmental uncertainty instrument is designed to measure both internal and external uncertainties. The respondents were asked to select the three most important factors they consider in their decision to use part-time and temporary workers. The possible decision factors are listed under the general category of internal and external. Table 6 summarizes the factors most frequently selected by industry. The three most important factors in each industry are classified as internal as opposed to external environmental factors. (There is a two-way tie for the third factor in the bottling industry. Demand is an external factor and the routine/nonroutine nature of the product is an internal one.) The identification of internal factors suggests that the use of part-time and temporary workers may be more of a coping response to internal environmental influences. The implication is that internal task predictability and work flow predictability might better explain the relationship between the buffering response and internal environmental uncertainty in this study.

TABLE 6
Most Frequently Listed Decision Factors in the Perceived Environmental Uncertainty Instrument by Industry[a]

Upholstered Furniture		*Soft Drink Bottling*	
	%		%
Work load fluctuations	70	Availability of manpower	65
Skills of employees	65	Work load fluctuations	55
Availability of manpower	45	Routine/nonroutine nature of product	30
Labor supply	35	Demand	30
Social responsibility	30		

[a] The responses are multiple ones and therefore will not total 100 percent.

As defined by Comstock and Scott (1977) these concepts refer to the extent to which raw materials and task activities associated with a particular job or combination of tasks (work flow predictability) are understood and nonproblematic. It appears that differences exist in the task and work flow predictabilities among different types of core technologies. In the upholstered furniture industry, the products are manufactured via a custom-made, intermittent, highly skilled labor-intensive system which permits the production of a wide variety of products. The products in the soft drink bottling industry are manufactured via a process, highly automated, continuous system that utilizes unskilled and semiskilled workers. One would expect task and work flow predictabilities to be lower in the upholstered furniture industry because the manufacturing process is more complex and elongated.

Support for this assumption is present in Table 3. This table reports the number of firms in each group of the 3 × 2 factorial design. There are differences between the uncertainty distribution of large firms in both industries (Groups III, IV, VII, and VIII). In the upholstered furniture industry, there were seven large firms with high uncertainty scores. In the soft drink bottling industry, seven large firms had low uncertainty scores. Table 6 indicates that the major environmental factors considered in the decision to use part-time and temporary workers were internal rather than external. Thus, the study suggests that one explanation for the differences among the uncertainty scores of large firms is attributed to their task and work flow predictabilities. Large upholstered furniture firms perceive high uncertainty, which perhaps may be attributed to the lack of task and work flow predictabilities. On the other hand, large soft drink bottlers perceive less uncertainty due to greater task and work flow predictabilities.

Woodward (1958) suggests that the predictability of task and work flow associated with a technology is linked to the use of the marketing function as a buffering device to reduce uncertainty. Small batch or unit production firms possess less predictable task and work flow and, according to Woodward, utilize the marketing function as one buffering response. But process production firms, with more predictable task and work flow, do not employ such buffering. These assumptions support the contention that task and work flow predictability may affect perceived uncertainty and therefore the use of buffering devices.

Size

Results of this study fail to support the hypothesis that a positive relationship exists between size and the use of part-time and temporary workers. The direction of the correlation in the upholstered furniture industry was negative ($r = -.40$). This negative correlation does suggest that an inverse relationship may well exist between size and the use of part-time and temporary workers. Additional analysis using a two-tailed test showed significance at the ($p < .076$) level. Further support for the direction of the relationship is provided by Table 5. This table shows that in both industries large firms use less part-time and temporary workers than do small firms. However, due to the method of sample selection and the sample size, this implication should be interpreted cautiously.

Litterer (1961, 1963) argues that as organizations grow in size, they tend to add buffering responses. The results of this study suggest that the relationship between size and buffering is more complex. One explanation for the declining use of part-time and temporary workers with increasing size of the sample manufacturing firms is the concept of slack associated with manpower resources. March and Simon define slack as the "difference between the resources available to the organization and the total requirements of the members of the organizational coalition" (1958, p. 126). Large firms are more likely to possess slack manpower resources and therefore possess the ability to redeploy excess permanent employees as the need arises. Small firms usually lack this kind of manpower flexibility. A second possible explanation is that functions such as maintenance or material handling are more frequently required only on a part-time basis by small firms but become full-time requirements as firms increase in size. A third reason may be attributed to slack associated with capital resources. Large firms tend to have more funds available for purchase of sophisticated equipment such as automated material handling systems. The purchase of such equipment may reduce a company's dependence on the use of part-time and temporary workers for these activities.

Interaction Effects

Although statistical significance was not found in the interaction effects of the variables, it is difficult to conclude that the variables—core technology, perceived environmental uncertainty, and size—are not related. A firm such as an upholstered furniture manufacturer or a soft drink bottler produces its products via a core technology which must interface with both internal and external environments. As discussed earlier, researchers including Child (1974, 1975), Aldrich (1972), and Pfeffer and Leblebici (1973) are currently exploring the various combinations and interactions of size, technology, and environmental variables as they relate to organization structure.

Results show that significant differences exist between firms with process technical cores and those with small batch or unit technical cores. Table 5 shows that in both industries, large firms use less part-time and temporary workers than do small firms. These results suggest that within a given type of core technology, size rather than the core technology may determine the amount of use of the buffering response.

No relationship was found between perceived environmental uncertainty and the use of part-time and temporary workers in either industry. However, in the preliminary analysis it was found that there were seven large upholstered furniture firms that had high uncertainty scores, but among soft drink bottlers, there were seven large firms that had low uncertainty scores. This suggests that the interaction of core technology and size may affect perceived environmental uncertainty. It appears that there is a core technology/size interaction. Since large firms are involved in both types of core technology, it may well be that core technology overcomes the size effect to influence the level of perceived environmental uncertainty among large firms. Future research could explore the exact nature of these relationships.

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Feedback About Personal and Organizational Outcomes and Its Effect on Persistence of Planned Behavioral Changes[1]

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This study examined the relationship between the presence and content of feedback about differentially valued outcomes and the decision to persist at a novel task performance strategy. Among other findings, the results suggest that the content of feedback, positive or negative, interacts with the value of the target outcome of the feedback to affect persistence.

This research examines the problem of creating persistent changes in work behavior through planned intervention techniques. The success of a wide variety of organization intervention techniques resides in the ability of the technique to be successful in producing new work behavior. For example, a participative management style cannot be implemented without the manager's behaving participatively, which might involve such behavior as soliciting input prior to decision making or delegating important tasks to subordinates. Unfortunately, the body of empirical and theoretical literature on behavioral persistence in such contexts is limited. The thrust of this report is to develop a general theoretical framework for the problem and to examine the impact of knowledge of results, or feedback, on persistence.

Most investigations of persistence of planned change are either case studies or repeated measure surveys. The case studies (Trist, Higgin, Murray, & Pollack, 1963; Rice, 1958) have the advantage of rich description, but they have little methodological rigor. The repeated measure studies provide a more rigorous basis for theory building. Hence this review is limited to them.

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[1] This paper is adapted from the author's doctoral dissertation, which was guided by Paul S. Goodman, Robert S. Atkin, and Richard Schulz at Carnegie-Mellon University. The author thanks them for their inputs and support. All materials used in this study including the questionnaires and individual item and scale statistics are available from the author on request.

The repeated measure investigations of planned change typically provide data on the long term trends within a variety of dependent measures of change effectiveness. The bulk of these studies focus on nonbehavioral criteria such as organizational climate measures (Golembiewski & Carrigan, 1970a, 1970b; Golembiewski & Munzenrider, 1973) or general effectiveness indicators such as work attitudes, beliefs, and overall profitability (Seashore & Bowers, 1970). Such surveys generally support the contention that planned interventions change *something* and that such changes do persist for some time. They do not, however, address the persistence issue at the level of specific behavior, nor do they sufficiently isolate, through experimental or correlational methods, the causes of the effects they report.

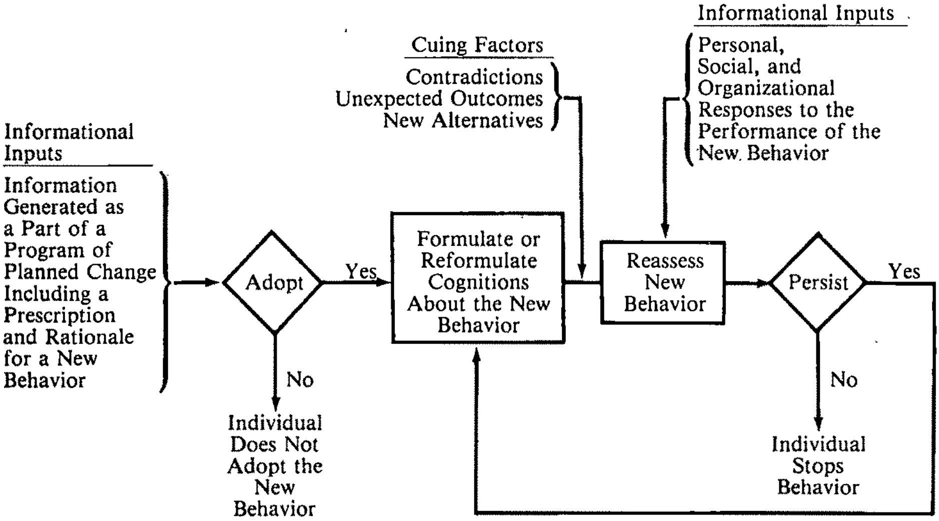
In a notable exception to the general literature, Scheflen, Lawler, and Hackman (1971) performed a field experiment on a behavioral manifestation of change in an attempt to demonstrate the effect of participation on success. The goal of the intervention was to reduce absenteeism by introducing a new pay policy. The results indicated a significant reduction of absenteeism in the experimental groups receiving the participative intervention as compared to the groups receiving a unilaterally imposed intervention or no intervention. Over time, attendance improved in the unilateral groups and approached that of the participative groups, but no change occurred in the no-intervention control groups. Based on these findings, Scheflen et al. concluded that participation was a more effective strategy because of its effects of members' (1) understanding of the purpose and (2) commitment to the goals of the change. Although this study provides support for participation, it is unfortunate that data were not available documenting the psychological impacts of participation on the motivation of individual members to reduce absenteeism. The authors' assertions about understanding and commitment are somewhat speculative. Additionally, Cook and Campbell (1976) have raised severe methodological problems with the experimental design.

At best, the existing literature on behavioral persistence in planned-change contexts indicates that there is some evidence that long term alterations of attitudes and behavior are *possible* with certain classes (i.e., participative) of interventions. The theoretical literature on planned change contains a variety of assertions about the importance of learning, commitment, knowledge of results, and motivation on the success of planned-change efforts (Argyris, 1970; Margulies & Wallace, 1973; Nadler, 1977). There is, however, no integrative framework that predicts behavioral persistence from the procedures and conditions of change or through their impact on psychological processes such as learning or motivation. The present research is a move in the direction of developing such a framework.

A DECISIONAL FRAMEWORK OF PERSISTENCE

The proposed framework will address the process of change and persistence at the level of individual behavior and cognition. Alternative levels of analysis such as the group level also may be reasonable, but it is premised that effective change involves, as its basis, some lasting alteration of individual behavior. The present discussion will be oriented toward voluntary rather than required change such as might occur by an alteration of structure or technology, although the framework would be applicable to either type of change.

FIGURE 1
A Decision Making Model of Individual Adoption and Persistence


Informational Inputs
Information Generated as a Part of a Program of Planned Change Including a Prescription and Rationale for a New Behavior
Adopt
Yes
No
Individual Does Not Adopt the New Behavior
Cuing Factors
Contradictions
Unexpected Outcomes
New Alternatives
Formulate or Reformulate Cognitions About the New Behavior
Informational Inputs
Personal, Social, and Organizational Responses to the Performance of the New Behavior
Reassess New Behavior
Persist
Yes
No
Individual Stops Behavior

The change process is assumed to result from a series of decisions by each individual participant (see Figure 1). This decision process is initiated by information originating from a change agent and including a prescription of a new work behavior (e.g., job rotation, joint decision making) and a rationale to support its adoption. Faced with such information, an individual must assess the new behavior in terms of the various consequences associated with adopting it. Expectancy theory (Vroom, 1964; Campbell, Dunnette, Lawler, & Weick, 1970) provides a useful heuristic for conceptualizing this process. It would suggest that the decision entails an assessment of (1) the probability that the individual can perform the behavior (i.e., the effort-behavior expectancy), (2) the probability that performance will result in the various outcomes suggested in the change agent's rationale and any other outcomes generated by the individual, himself, or his cohort (i.e., the behavior-outcome expectancies), and (3) the value of the outcomes for the individual (i.e., valences). Hence, the adoption of the new behavior results in a cognitive representation of the behavior consisting of its associated expectancies and outcomes. Expectancy theory predicts adoption when the expected value of the new behavior exceeds that of the perceived alternatives to adoption. In the present context, it is assumed that the adoption of a new behavior has occurred, and the focus is on the subsequent decision(s) to persist.

Following the initial decision to adopt, events may occur that cause an individual to reevaluate the newly adopted behavior. These reevaluations are labeled the *decision to persist*. There are two issues with regard to this decision: (1) what cues the decision (i.e., cuing factors) and (2) what determines the outcome of the decision.

There is no literature directly relevant to identifying those factors that cue reassessments of ongoing behavior, although it would be relatively simple to develop a laundry list of potential candidates. Rather than generating such a list, identification can be made of some broad classes of cuing factors that serve to illustrate the process. These are *contradictions*, *unexpected outcomes*, and *new alternatives*.

Contradictions

At a point of adoption it was assumed that individuals developed certain expectations that the behavior would result in some set of valued outcomes. Following actual performance of the behavior, however, information may arise that suggests that one or more of the initial expectations were incorrect, or that the outcomes were not as desirable as expected. These incidents are termed contradictions.

Unexpected Outcomes

Performance of a newly introduced behavior may result in more or different outcomes than initially expected or premised by a change agent. For example, the social dynamics of the work situation may contribute to praise or ridicule for adopting the new behavior. To the extent that such outcomes are valued by or important to individuals, they may result in a decision about persistence and, perhaps, a changed cognitive representation of the behavior.

New Alternatives

One correlate of introducing planned-change programs in organizations may be a tacit encouragement for incumbents to experiment with new work behaviors and to seek "better" modes of performance. Following the initial adoption of a new behavior, individuals may wish to experiment further with their behavior. Hence new alternatives to the adopted behavior may become prepotent and replace the newly adopted behavior.

The decision to persist may be cued repeatedly following adoption. Overt persistence of a behavior, therefore, may actually result from a number of serial reassessments of the behavior. The effectiveness of any particular factor in cuing a persistence decision very likely depends on the implications of the factor for the future rewards that will accrue to an individual. For example, information about the nonaccrual of a valued outcome (i.e., a contradiction) is more likely to trigger a reevaluation than is information about a neutral outcome. The same argument could be made for unexpected outcomes and new alternatives.

As with the decision to adopt, the determinants of the decision outcome may be examined in an expectancy framework. The individual again assesses expectations and valences of outcomes. Only, this time, the set of relevant outcomes, and the expectancies about the outcomes, may be different from those at the point of adoption. In the interval between initial adoption and reassessment the individual may have learned more about the behavior, the probability of occurrence of its various outcomes, and the value of those outcomes.

The implication of the present framework is that a newly introduced behavior may be expected to persist if (1) a reevaluation of the behavior is not cued or (2) if a reevaluation is cued but the behavior continues to be preferred over visible alternative modes of action. From an applied perspective, one way to create persistence might be to modify or maintain the work environment so that factors that might cue persistence decisions are eliminated. Alternatively, if cuing factors are inevitable, persistence may be maintained by regulating the net value (i.e., valence) of the new behavior either intrinsically, as through commitment, or extrinsically through the attachment of highly valued outcomes.

THE STUDY

The present study examines the effect of confirming or disconfirming information about two types of outcomes on the persistence decision. In the above model, disconfirming information is a "contradiction." The two outcomes were selected so that, a priori, one outcome would be valued primarily by the organization (i.e., quality or accuracy of work) and the other by the individual (i.e., earnings). In many change settings, such as the Rushton Quality of Work Experiment (Goodman, 1979; Conlon, 1978; Goodman & Conlon, 1977), individuals are asked to adopt voluntarily a new behavior because of its instrumentality for both individual and organizational payoffs. Unfortunately, feedback directly relating behavior to valued outcomes may not be readily available in all organizational contexts. For example, in the Rushton study, the change agents were limited to presenting data about the relationship between change and performance indicators that may have had little value to the actors, because these were the only indicators available. All other experiential evidence about the payoffs of newly adopted behaviors had to come from sources intrinsic to either the work group or the actor himself. Conlon's (1978) analysis of two behaviors introduced at Rushton, communication between work shifts (which persisted) and job exchange (which did not persist), suggests that because most of the feedback provided by change agents was associated with organizationally valued outcomes (i.e., production, costs, safety violations), the implicit costs of performing each behavior determined persistence. For example, job exchange required more effort and risked more personal embarrassment than did inter-shift communication.

The experimental conditions of the present study form an incomplete factorial design because two cells are not of theoretical interest. The result is a $2 \times 3 + 1$ control group experiment (Winer, 1971). In this design, three conditions of earnings feedback, which is personally valued, are crossed with two conditions of quality feedback, which is organizationally valued.

The dependent variables in this study are (1) the outcome of the persistence decision, that is, the stated intention to persist or not to persist and (2) the strength of the instrumental beliefs linking the new behavior with the earnings and quality outcomes (i.e., expectations). The hypotheses derived from this design are presented below.

> *Hypothesis 1. The decision to persist is affected only by feedback about personally valued (i.e., earnings) outcomes. Confirming feedback will increase the propensity to persistence, whereas disconfirming feedback will decrease that propensity.*

The second hypothesis is quite similar and deals with beliefs rather than behavior.

> *Hypothesis 2. Confirming feedback about the accrual of an outcome will increase the strength of the instrumental belief above that of the no feedback condition. Similarly, disconfirming feedback will decrease belief strength below that level.*

The first two hypotheses are closely related to Bennis and Schein's (1967) theoretical exposition on the effects of information on behavior and cognitive structure. In this case, the cognitive component is specifically identified as a behavior-outcome expectation.

From a practical perspective, the first hypothesis suggests that feedback about outcomes that are of no importance to participants is of little use in promoting persistent change. Unfortunately, many of the outcomes of new behaviors are oriented primarily toward performance increments and not to participant satisfaction. Support for this hypothesis would suggest that such behaviors would not persist without the application of specific ongoing rewards for performance.

The third hypothesis concerns the effect of feedback independent of its content.

> *Hypothesis 3. The content of feedback, and not its mere presentation, affects beliefs. It is the disconfirming or confirming quality of feedback that evokes belief change.*

The importance of this hypothesis is that feedback, independent of its implications for the attainment of valued outcomes, will not affect persistence. Stated differently, knowledge of the results of change is not sufficient to maintain it; the results must also convey information about rewards. There is some congruence between this notion and the established finding that knowledge of results, independent of goal setting, has no effect on performance (Locke, Cartledge, & Koeppel, 1968). One may assume that the attainment or nonattainment of previously set goals has implications for individual rewards.

The first three hypotheses suggest that the content of instrumental feedback, and the reward value of the feedback, are critical mediators of the persistence of newly introduced behaviors and the durability of beliefs about them. The fourth and fifth hypotheses are somewhat different and address the relationship between various bits of feedback and the inferences participants may make about the accrual of outcomes about which they have no information. This issue is important assuming that information about the accrual of all outcomes may not be available in organizations.

Hypothesis 4. When feedback is presented about more than one outcome, each type of feedback will act only on the outcome toward which it is directed.

Hypothesis 5. When the effect of feedback is transferred to the valued outcome, the decision to persist also will be affected in the expected direction, that is, the likelihood of persisting is greater following confirming feedback than following disconfirming feedback.

The above two hypotheses assume that in most organizational settings, there are, at least, naive beliefs about the relationship between quality and quantity of output, hence earnings. In the present design, the reward system rewards for both, so that stressing both generally will increase earnings. It is conceivable, however, that by working quickly and sacrificing quality, participants may increase earnings. Hence there is a built-in relationship between the two, which should provide the information implied by the last two hypotheses.

METHOD

Subjects

From a small, technically oriented eastern university, 70 undergraduate students, 49 males and 21 females, volunteered to participate in a 2-hour study on editing tasks. Subjects were recruited either from a sophomore level management course or from the general student population. In return for volunteering, all subjects were offered the possibility of earning $3 to $6. In addition, students from the management class were offered class credit. Management and nonmanagement students were distributed equally among experimental conditions. Otherwise, the assignment of subjects to conditions was random.

Task

The subjects' task was to find typographical errors that had been randomly placed in a 17-page manuscript consisting of feature articles from past issues of *Newsweek* (all issues were pre-1976). Subjects were told that errors had been randomly placed and that they should not dwell on the spelling of difficult words. Pretesting indicated that most subjects completed between 12 and 13 pages in the 40 minutes allowed for the task.

Similar proofreading tasks have been used in other work simulations (Herold, 1977).

Procedure

Depending on availability, three to five subjects were assigned to each experimental session. On arriving at the suite of offices that served as a laboratory, all subjects were seated around a conference table in one of the larger offices. Any subject who was late by more than 10 minutes was considered a "no-show."

The first half hour of the experimental session was devoted to orienting subjects to the study. This was accomplished by providing subjects with the "Participants Information Packet," a 7-page written document describing the study and by reading the document aloud and answering any questions asked by the subjects. The packet described the study as an exploration of new ways to perform editing tasks and identified the funding agency as the fictitious National Association of Publishers. Every attempt was made to make the study seem like part of a large scale, official project. The initials N.A.P. and a project number appeared on all documents provided to the subjects. These efforts were designed to increase the credibility of the study and encourage the subjects to assume work roles. The packet also described the task and the concept of role playing, stressing the importance of subjects' assuming the role of final copy editor. To this end, subjects were told that surveys of final copy editors indicated that they were college educated, bored with their work and money motivated. Most importantly, subjects were told that their pay for the study would be based on performance and that their performance would be monitored. Pay was to be based on accuracy and amount of work. An accuracy score would be calculated for each page by the following formula:

$$\text{Quality Score} = \frac{\begin{matrix}\text{\# of actual}\\ \text{errors found}\\ \text{on page}\end{matrix} - \begin{matrix}\text{\# of nonerrors}\\ \text{identified as}\\ \text{errors on page}\end{matrix}}{\text{Total \# of errors on page}}$$

This formula provides rewards for accurate indentification of errors but penalizes for identifying correct words as errors. The investigator worked through an example to illustrate this. Pay for the task would be based on the quantity of work completed according to the following schedule.

15 cents for each page completed with 90-94 percent accuracy
30 cents for each page completed with 95-99 percent accuracy
45 cents for each page completed with 100 percent accuracy

It was stressed that the same payment scheme prevailed whether work was performed alone or in pairs. Each member of the pair would be rewarded as if the pair's output was his own. It also was stressed that quality and pay need not be related because slowing down to obtain greater accuracy could reduce output enough that total earnings would decrease. In contrast, a reduced output coupled with higher pay per page might also increase earnings.

The final page of the packet introduced the organizational scenario. Subjects were told by the investigator that he would play the role of a consultant who had been hired by the firm to "improve the quality of final copy editing." They were asked to imagine that they had all been final copy editors for at least two years and were accustomed to using an editing technique called "the dyad method." It was explained that in the dyad method, two editors work together on each manuscript with one reading aloud and the other following silently. If either found an error, he/she would announce it and the silent reader would circle it. The investigator then provided a practice manuscript and, while reading it aloud, had subjects follow silently and circle errors. In this way, the subjects gained some experience with the dyad method.

At this point, the investigator introduced a new work strategy by stating the following:

> I would like you to try some different techniques for final copy editing and then answer some questions about them. Here is what I will do. First I will show you a new technique, then I will let you try it out for a time, then I will ask you some questions to see how you feel about it. For each technique, I will monitor your performance so I can tell how you are doing. I have a template for each page of the manuscript I give you that will allow me to quickly calculate your quality and earnings.

At this point the investigator demonstrated how a xerographic transparency with errors circled may be used to grade each page of the manuscript. He continued...

> The first technique I would like you to try is the alone method (passes out description and reads)....The alone method requires that final copy editors work on each manuscript alone. Each editor reads silently and circles errors. The completed manuscripts are then checked by a second editor at a later time. Although final copy editors do not work in isolation, they do not work explicitly as a team. We would like you to try this method out and let us know how you feel about it. Sometime during the trial period, I will collect some samples of your work to see how you are doing. Using these samples, I can provide you with an accurate projection of your quality and hourly earnings. Your pay today will be based on the payment system described earlier. Because there will not be a second editor checking your work today, I will increase your accuracy score by the average percentage increase added by a second editor.

Finally, the investigator communicated the initial expectations about the new work strategy by stating that a preliminary study at Yale University has shown the alone method to be superior on both quality and earnings. He showed the subjects a Yale working paper by "Frank Singleton" and opened it to a table showing the alone method to be superior. He reviewed the table suggesting that anything over a one-half percent increase in quality is a significant improvement. In this way, the expectations that the alone method would dominate on both earnings and quality were communicated from a credible source.

At this point the investigator provided each subject with a manuscript and escorted him/her to a separate room. The total performance period lasted for 40 minutes. During this time feedback (i.e., the independent variable) was presented (discussed below). Following this period, subjects were asked first to complete a questionnaire that obtained dependent measures and, following that, to complete a second questionnaire that assessed the experimental manipulation. Subjects were then debriefed, paid $5.00 and dismissed.

Feedback

The presentation of performance feedback was the basis for the experimental conditions. Feedback was patterned to produce the 2 × 3 + 1 design already outlined. Performance data were collected at 10 and 25 minutes of the performance period and feedback was presented at 25 and 40 minutes (i.e., the end).

Feedback was given by the investigator in written form by presenting a xerographic sheet with numbers filled in and verbally by reading the sheet aloud. The actual numbers presented in each experimental condition are displayed in Table 1. In all cases, these numbers were contrasted with the average earnings and quality that could be expected in the dyad condition. The difference between these amounts were also presented on the feedback sheets and are displayed in Table 1.

TABLE 1
Feedback Patterns

Quality Feedback (Average quality score for dyads in 93.5%)

Feedback Trial	*Confirming* score	*Confirming* difference	*Disconfirming* score	*Disconfirming* difference	*Partial* score	*Feedback* difference
First	94%	+.5	93%	−.5	93.4%	−.1%
Second	95%	+1.5	92%	−1.5	—[a]	—[a]

Earnings Feedback (Average earnings for dyads is $2.78)

Feedback Trial	*Confirming* score	*Confirming* difference	*Confirming* weekly	*Disconfirming* score	*Disconfirming* difference	*Disconfirming* weekly	*Partial* score	*Feedback* difference
First	$3.10	+.32	+12.80	$2.50	−.28	−$11.20	2.81	+$ .03
Second	$3.20	+.42	+16.80	$2.40	−.38	−$15.20	none	none

[a] The quality feedback presented on the second feedback trial in the partial feedback conditions was the same as either the disconfirming or confirming quality conditions.

MEASURES

Immediately following the second administration of feedback, subjects were provided with a questionnaire titled the Work Opinion Inventory, which provided the dependent measures.

Strategy Choice

Before leaving the subject's room, the investigator said:

> Recalling that you are playing the role of final copy editor and that I am a consultant, I would like to know the following. If you could make a choice now about how you would permanently perform this task, how would you do it? After I leave, circle either the dyad or alone method listed on the front of the inventory. Then fill out the questionnaire.

The investigator then briskly left the room allowing each subject to complete his/her questionnaire.

Belief Strength

The questionnaire items used in this study to measure belief strength follow the suggestions of Fishbein and Ajzen (1976) for such measures. Three types of items were used for each belief (i.e., quality and earnings): two 8-point Likert type items, two 8-point semantic differentials, and one 11-point subjective probability estimate for each belief (see Table 2). The scoring of the Likert-type items and semantic differentials was counterbalanced. These items were interspersed with a large number of filler items, such as "it takes a positive attitude toward work to do final copy editing," which are of no theoretical interest here.

Manipulation Check

Following the administration of this inventory, subjects received a post-experimental questionnaire which assessed the criteria on which strategy choices were based and which asked several items about subjects' prior knowledge and beliefs about the study. These items were used to check some of the investigators' prior assumptions about how the subjects would respond to the experimental induction and feedback. They were also used to check for suspicion about the study.

RESULTS

Manipulation Checks

There were three aspects of the experimental design that required post hoc assessment. These were (1) the use of the desired outcomes in the persistence decision, (2) the possibility of experimenter "demand effect," and (3) subject's suspicions about the veridicality of feedback.

The analysis of criteria used to choose future work strategy provides a test of outcome importance. These criteria were assessed through an open-ended item asking subjects to list an undetermined number of "reasons" for their choice. On an a priori basis, earnings, accuracy, interest, and speed were expected criteria. A post hoc analysis suggested the inclusion of the additional criterion classes of preferences for working alone or together, general performance expectations, and self-assessments of one's own ability. Data on the percentage of subjects citing a particular class of criteria were tabulated and are available from the author. This tabulation indicates that 52 percent of those subjects receiving information about earnings reported using earnings as a criterion as compared to 30 percent who received no information about earnings. These findings support the assumption, based on the role play induction, that earnings would be a dominant decision criterion. It also suggests that the use of earnings as a criterion was contingent on the availability of earnings feedback because 52 percent of the subjects receiving earnings feedback used earnings as a criterion as compared with only 4 percent in conditions where such feedback was not available.

A second factor assessed in the manipulation check was the possibility of demand effects. The investigator was concerned that subjects might have believed that he specifically wanted them to choose either the dyad or the alone method. The tabulation of decision criteria described above indicated that no subjects reported a strategy choice made on the basis of experimenter demand. In addition, a further analysis was performed on responses to a question asking subjects about the purpose of the study. This analysis revealed that 58 of 70 subjects reported some variation of the "cover story." Ten others reported that the study examined feelings about working alone rather than together. The only subject who reported any suspicion of deception said the study was tricky. Finally, the remaining subject thought the study "manipulated choices." The distribution of the 12 subjects not reporting the "cover story" was roughly uniform across feedback conditions. In conclusion, the design of the study seems satisfactory in controlling for demand effects and in focusing attention on the relevant work outcomes for making strategy choices.

Whenever false feedback is used in studies, there is always a chance that subjects may become suspicious or not believe it. One indicator of suspicion is the general question assessing subject's beliefs about the study. Suspicion about the performance data was never mentioned in responses to this item. Additionally, the debriefing of subjects always opened with the following two questions: (1) "Are there any questions about the study?" and (2) "Did anything bother you about the study?" The modal responses to these questions were either "no" or "What is the study *really* about?" The latter question, on probing, was found to be a reaction to the questionnaire item assessing beliefs about the study. Again, there was no indication that subjects were suspicious about the procedures used in the study. Pretesting revealed that questionnaire items that specifically assessed suspicion about various aspects of the study, including feedback, did more to arouse suspicion than to assess it. Hence the general questions, indicated above, were adopted. Finally, the dependent belief variable provides an indication of the acceptance, hence perceived validity, of feedback. The analysis in Table 3 demonstrates that even when earnings and accuracy feedback were discrepant, there was no significant cross-over effect in which earnings feedback affected beliefs about quality and so forth. In summary, it appears that even though feedback was falsified, it was accepted by the subjects without suspicion.

Item Analysis

Two classes of data were collected as dependent measures. One type of data was a choice between the dyad or alone method. These were simply coded "1" for choice of alone and "0" for dyad, resulting in a binary nominal variate representing the strategy choice. The belief strength measures required additional analyses.

Prior to constructing the composite scale scores, individual item scores were standardized and coefficient alpha (Nunnally, 1967) was calculated for each scale. It was discovered that the semantic differential items for both earnings and quality that used the anchor "Doing final copy editing in a dyad" were somewhat less highly correlated with the composite than were the other items, although alpha's for each scale were .910 and .816, respectively. It was found that coefficient alpha was maximized by omitting that item from both scales. Final coefficients alphas were .910 for the earnings belief strength scale and .837 for the quality belief strength scale. Scales were calculated by combining individual item scores using unit weighting ("-1" for reversals) so that a high belief strength score indicated a strong belief that the alone method leads to higher earnings (or accuracy). The correlation between the accuracy and earnings scales was .30. Because of the potential biases inherent to not cross-validating these scales, the remainder of the analyses were performed using both the 4-item and 5-item scales. Although the estimates of means and variances differed slightly, there were no differences in the results obtained between these scales. Hence, only the results from the analysis using the 4-item scale are reported here.

Tests of Hypotheses

All hypotheses were tested using the group comparison analyses (GCA) developed by Wolf and Bassler (1977a). This technique permits comparisons among any combination of conditions (i.e., cells) in an experimental design and produces as output (1) an "*F*" statistic for the particular contrast and (2) an estimate of the population variance accounted-for (Rho) by the particular hypothesis. Significance tests for contrasts of the binary variate were performed using an extrapolation of GCA to the binary dependent variable case (Wolf & Bassler, 1977b). Individual cell means and

TABLE 2
Means and Standard Deviations of Earnings and Quality Belief Scale Scores and Choice Frequency Counts by Experimental Condition

	Feedback Condition		*Choice*[a]	*Earnings Belief*		*Quality Belief*	
	Earnings	*Quality*	*Count*	*Mean*	*S.D.*	*Mean*	*S.D.*
1.	Confirm	Confirm	9	3.36	1.68	2.71	2.67
2.	Confirm	Disconfirm	7	3.39	1.39	-1.99	3.14
3.	Disconfirm	Confirm	4	-3.89	2.55	.86	3.69
4.	Disconfirm	Disconfirm	2	-3.43	2.29	-1.27	2.50
5.	None	Confirm	7	1.58	2.52	.89	3.92
6.	None	Disconfirm	4	-1.99	2.78	-1.53	2.36
7.	None	None	9	.97	1.62	1.04	2.60

[a] The choice variable is the number of subjects choosing to remain with the alone method.

standard deviations, as well as frequency counts for choice of the "alone" strategy, are presented by conditions in Table 2.

GCA uses an estimate of mean squared error that is calculated from the within-cell variance and degrees of freedom for all experimental conditions. It is possible to change the value of this estimate by selectively excluding some cells from the calculations for a particular comparison (e.g., by analyzing the $2 \times 2 + 1$ ANOVA independently of cells 5 and 6). For all comparisons made in the present analyses, the variances of all seven cells were included in the calculations.

In the interest of consistency, the same set of contrasts was made for all three dependent variables. The contrasts and the relevant summary statistics are displayed in Table 3. The rows of this table refer to individual contrasts. The first five contrasts are orthogonal. The remaining four contrasts are linearly interrelated and provide specific comparisons between the control group and certain feedback conditions. The latter comparisons are also not independent of the "main effects" tests in contrasts 2 and 3. The first seven columns of Table 3 specify the contrasts. The sum of the first seven column entries for any row of Table 6 is 0. Note that the first four rows of Table 3 specify all of the contrasts typically performed in an ANOVA for a $2 \times 2 + 1$ experimental design (Winer, 1971) where Contrast 1 is the control group versus all other comparison, Constrasts 2 and 3 are column and row effects, respectively, and Contrast 4 is the interaction term. The remaining columns of Table 3 contain the test statistics generated by GCA for each of the dependent variables. Rho for each variable specifies a population estimate of the percentage of total variance accounted for by each contrast and is mathematically equivalent, in the ANOVA case, to omega squared (Hays, 1973). C for the choice variable and F for the belief strength measures are tests of the significance of each contrast for the particular dependent variable.

Hypothesis 1—The first hypothesis predicted that earnings feedback would affect the decision to persist, but accuracy feedback would not. Specifically, the likelihood of persisting (i.e., number of choices of the alone method) should be greater in the confirm earnings conditions than in the disconfirm earnings conditions, whereas that likelihood should be the same in the confirm and disconfirm accuracy conditions. Contrast 2 tests the effect of earnings feedback; the contrast is highly significant on the choice variable ($C = 10.72$, $p < .001$) and accounts for about 14 percent of the variance. Contrast 3 tests the effect of accuracy feedback. This contrast accounts for no variance in the choice variable and, of course, is not significant ($C = 2.01$, N.S.) (Because Rho is an estimate, it may take small negative values which should be interpreted as 0.) Hence, the data provide strong support for Hypothesis 1.

Hypothesis 2—The second hypothesis predicted that confirming feedback about a specific outcome would increase the strength of the instrumental belief about the outcome. Similarly, disconfirming feedback would decrease the strength of the belief. For the belief about earnings, Contrast

TABLE 3
Results of the Group Comparison Analysis (GCA)

	Contrasts Among Feedback Conditions[a]							*Dependent Measures*					
	(Earnings – Accuracy)							*Strategy Choice*		*Earnings Belief*		*Accuracy Belief*	
Contrast #	*1* *C–C*	*2* *C–D*	*3* *D–C*	*4* *D–D*	*5* *N–C*	*6* *N–D*	*7* *N–N*	*Rho*	*C*	*Rho*	*F*	*Rho*	*F*
Orthogonal													
1	.25	.25	.25	.25	0	0	-1	.054	4.6*	.014	2.0	-.003	.8
2	.5	.5	-.5	-.5	0	0	0	.143	10.7**	.587	100.4**	-.009	.4
3	.5	-.5	.5	-.5	0	0	0	-.015	2.1	-.013	.1	.142	12.6**
4	.5	-.5	-.5	.5	0	0	0	-.014	0.0	-.013	.1	.011	1.8
5	0	0	0	0	1	-1	0	.018	2.8[b]	.146	12.9**	.009	1.6
Correlated													
6	.5	.5	0	0	0	0	-1	-.010	0.0	.089	7.8***		
7	0	0	.5	.5	0	0	-1	.138	10.8**	.285	28.9**		
8	.5	0	.5	0	0	0	-1	.016	2.0			-.009	.4
9	0	.5	0	.5	0	0	-1	.077	6.1			.060	5.1[c]

[a] Entries refer to weighting of cell means in the contrast.

[b] $p < .1$

[c] $p < .02$

*$p < .05$

**$p < .001$

***$p < .005$

2 provides a simple comparison for confirming versus disconfirming feedback, whereas Contrasts 6 and 7 compare the confirming and disconfirming feedback conditions, respectively, with the no-feedback (i.e., control group) case. Contrast 2 is significant ($F = 100.4$, $p < .001$) and accounts for about 59 percent of the variance in earnings belief strength. Contrast 6, confirming versus no-feedback, is also significant ($F = 7.8$, $p < .005$) and accounts for about 9 percent of the variance. Contrast 7, disconfirming versus no-feedback, is significant ($F = 28.9$, $p < .001$) and accounts for about 28 percent of the variance. Contrasts 3, 8, and 9 provide a similar set of tests for the accuracy belief. Contrast 3, confirming versus disconfirming feedback, is significant ($F = 12.6$, $p < .001$) and accounts for 14 percent of the variance in belief strength. Contrast 8, confirming versus no feedback, is not significant and accounts for no variance. Contrast 9, disconfirming versus no feedback, is significant ($F = 5.1$, $p < .05$) but accounts for only about 6 percent of the variance. Hence Hypothesis 2 is strongly supported in the case of earnings beliefs, but only partially supported, and much less robustly, in the case of beliefs about quality.

Hypothesis 3—The third hypothesis predicted that feedback, independent of its content, would have no effect on belief strength. This hypothesis is tested by Contrast 1 and is supported for both earnings ($F = 2.0$, N.S.) and quality ($F = .8$, N.S.). It is interesting to note that Contrast 1 is significant for the strategy choice variable ($C = 4.62$, $p < .05$). More will be said about this finding in the discussion section.

Hypothesis 4—Hypothesis 4 predicts that the confirming and disconfirming effects of accuracy feedback will transfer to the earnings belief in those cells where no feedback is available about earnings, but not in cells where earnings feedback is presented. This prediction is supported by contrast ($F = 12.9$, $p < .001$) in which the transfer effect is demonstrated for earnings beliefs in cells 5 and 6 and by Contrast 4 in which no transfer is demonstrated ($F = .01$, N.S.) in cells where earnings feedback is available. The transfer effect, it should be noted, accounts for about 13 percent of the variance in the earnings belief measure.

Hypothesis 5—Hypothesis 5 is related to Hypothesis 4 and predicts that the likelihood of persistence will be affected in those cells where the transfer effect occurs (i.e., cells 5 and 6). Contrast 5 suggests only a weak effect ($C = 2.76$, $p < .1$) on the choice variable, accounting for only 2 percent of the variance in the measure.

It should be noted that Contrast 5 is not significant for the accuracy belief ($F = 1.6$, N.S.). This result is somewhat anomalous and will be discussed below in the context of information salience.

DISCUSSION

The major objective of this study was to investigate the effects of instrumental feedback on (1) the decision to persist at a newly introduced work strategy and (2) the durability of communicated beliefs about change. It may be concluded from the study that:

(1) Confirming and disconfirming feedback about the expected outcomes of a behavior affects the decision to persist only when the outcomes are valued.
(2) It is the content of feedback, and not its presence, that affects behavior and beliefs.
(3) Feedback has an impact on the strength of beliefs to which it is targeted and, when no other feedback is available, may transfer to beliefs about outcomes that are indirectly related to the instrumental feedback.

Several issues may be raised concerning the interpretation of these results. The first issue concerns the interpretation of the "transfer effect" addressed in Hypotheses 4 and 5. As is clear from the induction, subjects should have expected a positive correlation between earnings and quality. Yet the feedback system, and the actual feedback presented, were designed so that negative correlations among averaged data were possible. The payoff system was structured on a stepwise, per-page basis, but feedback was presented on an average basis. It was thus possible for an individual performing above average in accuracy with an average number of pages completed to receive below average earnings, assuming wide variance in accuracy across pages. In fact, the deviations of average quality feedback from the per-page cutoff points for pay were kept small to make discrepant feedback plausible. The lack of suspicion about feedback and the absence of any "transfer effect" in the cells where both quality and earnings data were presented support the effectiveness of the induction. A problem arises, however, in interpreting the transfer effect in the partial information cells. The naive belief, given the experimental induction, probably supported a positive correlation between pay and accuracy. Subjects may have simply assumed that higher accuracy meant higher earnings. Yet only 20 percent of these subjects, as contrasted with 52 percent in the full information cell, used earnings as a decision criterion. An alternative explanation for these results is that subjects simply generalized success or failure on one parameter to success or failure on all parameters (Breer & Locke, 1965), and made a persistence decision based on a kind of "halo effect." From a practical perspective, the issue of "transfer" is important, especially when the time frame for obtaining data, or the availability of data, about the effectiveness of a behavior change may necessitate persistence decisions based on incomplete information. The issues of when and how feedback is generalized to effect broad classes of beliefs requires and deserves further research.

A second issue concerns the validity of the expectancy model as a heuristic for modeling the persistence decision. Clearly, this study presumed some correspondence between instrumental beliefs about earnings and persistence. The Pearson product moment correlation between the earnings belief and persistence was .64, yet nine individuals persisted in the no-feedback condition, equalling the number of individuals who persisted in the confirm-confirm cell and exceeding that of the confirm-disconfirm cell (i.e., 7), even though the earnings beliefs among these cells differed in the expected direction. The absence of a significant difference in persisting between the confirm earnings cells and the no-feedback cell appears anomalous in view of the proposed model if one expects a correlation between the two parameters within the distribution of earnings beliefs represented in those cells. The within subjects choice perspective on expectancy theory, supported by Mitchell (1974), suggests an explanation for the results. If one assumes that expectations guide behavior, the relation of an expectation to the binary choice of persisting or not persisting requires the specification of a threshold for the expectation that, when exceeded, will produce a persistence decision. In the present study this threshold probably reflected a comparison of the instrumental belief about working alone with that of working together. The experimental manipulation in the no-feedback condition provided baseline information that working alone may be better than working together. This was the only manipulation of this belief in this condition, as contrasted with the confirming and disconfirming information in the feedback conditions where experiential data were provided that either supported or rejected the initially induced belief. Hence, it is not surprising to find subjects persisting in the no-feedback case. The only information they have indicates that they should! Stated differently, the expectancies of subjects in this condition were above the threshold for persistence. The result is a "boundary" effect or restriction on the correlation expected among the persistence and belief measures in the "confirm earnings" and "no-feedback" cells. In this study, the notion that "alone is better" was saleable without feedback, causing disconfirmation to have the most impact on the persistence measure. Hence, the results do not contradict the expectancy model, but neither should they be considered a strong test of expectancy perspective on persistence. A possible variation on the present study might be to change the potency of the initially communicated beliefs in order to investigate the role of confirmation, disconfirmation, and expectations more completely.

Finally, there was an apparent difference in salience between feedback about earnings and that about accuracy. This effect is most apparent in the comparison of Rho's for the main effect of earnings feedback on the earnings belief (Rho = .147). There are two interpretations of this result. First, accuracy information may have been considered relatively unimportant by subjects except as a diagnostic to poor earnings. Alternatively, the magnitude of a change from $2.78 to $3.20 an hour may have been perceived by subjects as much greater than a change from 93.5 percent to 94 percent accuracy. The former interpretation would have strong implications for the efficacy of pay versus nonpay feedback in producing persistence. The latter interpretation suggests only that the magnitude of variation for the two outcomes was unequal in the study.

Although this study was concerned with feedback, it differs from prior studies, including those on knowledge of results (KR), in several respects. Most KR studies have been concerned with the effects of feedback on skill acquisition or learning (Annett, 1969). Others have examined the interrelationships among KR, motive or goal states, and performance measures (e.g., Locke et al., 1969; Clarke, 1972; Chaikin, 1971). Most of these studies treat KR as a kind of post hoc occurrence which, in combination with certain personal states or goals, has reinforcing properties (Locke & Schweiger, 1978). The present research attempts to place KR in a more general, organizational perspective. That individuals have instrumental orientations toward work and instrumental goals is a fact of organizational life. An understanding of the persistence and institutionalization of work behavior should recognize such orientation as primary contributors and identify those facets of organizational environments that contribute to their development or change (Goodman, Conlon, & Bazerman, 1980). Such research necessitates a reasonably broad view of feedback such as Herold and Greller's (1977) model and a model of individual behavior such as that presented in Figure 1. Research on the durability of planned change should concern those elements of the organizational environment, such as feedback, that affect the evocation and outcomes of individual decisions to persist at new modes of behavior.

CONCLUSION

This research was an attempt to formulate a decision making framework that would be useful for developing research on the adoption and persistence of new behavior in planned change contents. The resultant framework then was applied to an investigation of some effects of feedback on the persistence of new behavior and beliefs. The results appear to have useful implications for the structuring of planned-change programs.

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Job Switching in Autonomous Work Groups: An Exploratory Study in a Pennsylvania Coal Mine[1]

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This 13-month field study explores the phenomenon of job-switching behavior and attempts to isolate some of the critical variables associated with job switching in autonomous work groups. Results indicate that age and job status are strong influences on job switching. Job switching correlated negatively with job satisfaction and positively with absenteeism, feedback, task identity, and hazard.

Increasing attention and concern has been directed during the past decade to the conservation of diminishing resources and to the amelioration of the high personal and social costs of unsatisfying work. Evidence suggests that one means to these ends is through the systematic redesign of jobs and the workplace (*Work in America*, 1973; Sheppard & Herrick, 1972; Jenkins, 1974; Hackman & Suttle, 1977; Davis & Cherns, 1975; O'Toole, 1974; Cummings & Molloy, 1977). One approach to job design gaining increasing acceptance involves use of the internally-led, self-regulating, autonomous work group.

Autonomous groups are a structural form in which an attempt is made to *jointly optimize* (Trist, 1973) both the technical and social components of work in order to optimize the overall production system. This approach to work design recognizes that grouping workers solely on the basis of task requirements as prescribed by the traditionalists, or solely on the basis of postulated psychological needs as prescribed by many human relations theorists, frequently results in a suboptimal production system. Autonomous group theory places these two viewpoints in proper perspective through its emphasis, not on individuals or individual tasks, but on the

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systematic grouping of interrelated tasks leading to the development of mutually supportive roles contained within the clearly defined boundary of a primary work group. The locus of control is internal rather than external, and the group is able to exercise considerable influence over such factors as goal setting, work methods, task assignment, membership, and supervision (Gulowsen, 1972).

The design of autonomous groups begins with the specification of the minimal set of boundary and task control conditions needed to create a self-regulating work system for a given task environment. The remaining task and control variables are permitted to vary with the needs of the situation, providing the work group freedom to respond to both internal and external sources of variance from the group's goals. Although the minimal set of task and boundary conditions necessary for self-regulation are situation specific, they can be summarized briefly from the literature as follows: (1) inclusion within a single social unit responsibility for the total production unit, (2) inclusion within the unit of all functions and technical skills necessary for process control, maintenance, and adjustment, including self-maintenance and adjustment, (3) a clearly definable and measurable outcome state, and (4) joint commitment by individual members of the social unit to optimize the functioning of the unit with respect to the outcome state (Cummings & Molloy, 1977; Cummings & Griggs, 1976; Susman, 1976).

An important source of potential response variability for variance control results from possession by the group members of requisite task skills. Trist and his colleagues (Trist, Higgin, Murray, & Pollock, 1963) have shown that the members are able to self-regulate and control the group task best where the members are multiskilled, all-around workmen. Ideally, each worker should be able to perform a wide variety of tasks and be able to switch jobs, replacing his co-workers when they are tired, bored, or absent. According to Rice (1958), comprehension by the workers of a variety of skills along with job switching tends to reduce the likelihood of occurrence of prestige and status differences within the group. In addition, it allows for improved communication and greater stability of the group's internal structure (cf. Trist, 1973, p. 106). Failure of the group's members to develop these multiple skills can lead to role differentiation and status differences that tend to reinforce external affiliation and inhibit internal mobility (Miller & Rice, 1967).

Experimentation with autonomous work groups began with the pioneering work of Eric Trist and his colleagues who were attempting to find the effects of different forms of work organization with different forms of technology in the British coal industry (Trist & Bamforth, 1951; Trist et al., 1963). This research has continued for more than 25 years in a variety of industries and in several cultures (Emery & Thorsrud, 1969, 1974; Engelstad, 1972; Herbst, 1962, 1974; Hill, 1971; Miller & Rice, 1967; Susman, 1968, 1970a, 1970b; Emery & Trist, 1960; Rice, 1958; Trist, Susman, & Brown, 1977; Srivastva, Salipante, Cummings, Notz, Bigelow,

& Waters, 1975). However, the major thrust of almost all of these studies has been toward the application of autonomous work groups for improved organizational effectiveness rather than a systematic investigation of the contingencies appropriate for their proper formation and functioning. Cummings and Griggs comment in this connection: "As a result, after numerous field experiments, little cumulative knowledge has been gained regarding the conditions for autonomous group functioning" (1976, p. 89).

Attention was recently focused on this lack of knowledge during an action research project of several years' duration inside a Pennsylvania coal mine. This project was designed by Trist and his colleagues (Trist et al., 1977) to test, among other things, the applicability of autonomous work groups in American coal mines. The miners who volunteered to participate in the project were accepted with the understanding that they would function as autonomous work groups. They were given responsibility for an entire geographic section of the mine known as a section. In order to encourage the sharing of responsibility for work, all of the men in the experimental group were paid the same top pay rate equal to that received by the highest skilled job classification in the section. The section foreman, who previously had been directly responsible for production, was relieved of this responsibility, which was then assumed by the work group. See Trist et al. (1977) and Blumberg (1977) for a more complete description of the mine and larger action research study.

Based on their earlier research with autonomous work groups, Trist and his colleagues felt that an important source of potential response variability for variance control lay in the possession by the group members of requisite task skills. Therefore, in addition to providing for formal classroom training, the research group requested the miners to learn and perform jobs outside their primary job classifications, i.e., to engage in *job-switching behavior.* However, after five months much less job switching was occurring than had been anticipated. A check after one year revealed the same thing. Because no research relating to this phenomenon could be located and because job switching was known to be important for the self-regulation of autonomous groups, the present research was undertaken. Its primary purpose was to explore the phenomenon of job switching and to isolate some of the variables associated with job-switching behavior in autonomous work groups.

METHOD

Strategy of the Research

A search of the appropriate literature for possible clues to relevant variables revealed only six previous studies relating to task allocation in autonomous work groups (Emery & Thorsrud, 1974, 1976; Herbst, 1962, 1974; Susman, 1968, 1970a, 1970b). However, none of these studies related, even in a general way, to job-switching behavior, so there was no empirical base on which to build a traditional hypothesis-testing study. Instead, it was decided to undertake a three-phase exploratory analysis.

In the first phase of the research, the researcher attempted to gain familiarity with the problem through the use of observation and unstructured interviews with the miners and many others with mine-related knowledge and experience, such as mining engineering professors, retired miners, and mining equipment sales engineers. In addition, the researcher "sat in" on an advanced course in mining engineering. As the study progressed, the available literature and observational information suggested more specific questions for which answers were obtained by use of a more structured interview technique. Finally, it was possible to formulate some working hypotheses that permitted the use of statistical methods. To reinforce (and sometimes contradict) the results of the statistical findings, they are combined and interpreted with the observational data, providing the greater rigor of statistical treatment while preserving the rich contextual significance of a unique research site (Scott, 1965; Madge, 1965).

Although no studies directly relating to job switching in autonomous work groups could be found, it still was possible to gain some insights from the literature. For example, if job-switching behavior is viewed as a class of behavior resulting from a decision by the individual to participate in an enlarged job, or to withdraw, at least temporarily, from a distasteful one, the literature relating to participation, job enlargement, resistance to change, and employee reaction to job characteristics might be expected to yield some valuable suggestions, clues, and questions relevant to the present exploratory research.

An examination of the findings relating to participation and resistance to change (French, Israel, & As, 1960; Coch & French, 1948; Lawrence, 1954; Gouldner, 1954; Rosen et al., 1965; Emery & Thorsrud, 1974; Trumbo, 1961; Krick, 1959; Watson, 1969) provided a number of suggestions that seemed to have some relevance for a study of job-switching behavior. Additional clues came from the literature treating individual response to enlarged jobs (Blood & Hulin, 1967; Hulin, 1969; Katzell, Barrett, & Parker, 1961; Robey, 1974; Susman, 1973; Turner & Lawrence, 1965; Vroom, 1960; Tosi, 1970). Finally, published studies relating individual response to task characteristics (Vernon, Bedford, & Wyatt, 1924; Wyatt & Fraser, 1929; Turner & Lawrence, 1965; Hackman & Lawler, 1971) proved to be a rich source of possible relationships.

The literature review, combined with the researcher's field observations for nearly a year suggested the reasons, shown in Table 1, why a miner might be unwilling to engage in job-switching behavior. Obviously, the inverse of many of these statements might also be reasons why a miner would be willing to switch jobs.

A content analysis of Table 1 suggests that job-switching behavior is associated with a broad spectrum of variables. Conceptually, they seem to fall into two general categories: a complex issue of variables related to the

TABLE 1
Summary of Reasons for Avoiding Job-Switching Behavior

1. Social inertia or habit—the tendency to retain the status quo and to oppose change merely because it is different.
2. Uncertainty and risk avoidance—the tendency to avoid change because of the uncertainty of the results from a new method or procedure.
3. Lack of understanding of the importance of the planned change.
4. Vested interests—individuals who have spent long years accumulating skills, judgment, and prerogatives tend to resist changes to a system that will make these fruits of experience irrelevant or obsolete.
5. Social prohibition—the proposed change might violate norms or values of the work group or custom and tradition of the subculture.
6. Lack of legitimacy—the proposed change may be perceived to be outside the rejector's area of interest, responsibility, or influence.
7. Management pressure for high levels of production.
8. Desire to avoid the more dangerous jobs.
9. Lack of interest in new learning situations because of earlier nonrewarding or punishing experience with learning situations.
10. Lack of confidence in the ability to learn new jobs.
11. Fear of loss of seniority.
12. Belief that knowledge of how to perform an undesirable job may somehow lead to a permanent assignment to it.
13. Reluctance to exert the effort required to learn a new job.
14. Disruption of established social relationships.
15. Lack of confidence in the technical validity and feasibility of the proposed change.
16. Personal needs of the individual are well satisfied in his present situation.
17. High state of job-related anxiety.
18. Subcultural predispositions opposing job-switching behavior.
19. Rejection of the change agent personally or of the values he represents.
20. Loss of job satisfaction—the proposed change may result in a loss of challenge, status, or self-expression in a job.
21. Resentment of criticism—the rejector may be the person who has originated the present method.
22. Lack of physical or motor skills necessary to perform certain jobs effectively.
23. Feelings of inequity—the rejectors may feel that their current rate of reward, or the rate of reward under the proposed new system is not sufficient for job switching.
24. Feelings of inadequacy in present job—the individual may feel that he has not yet reached an effective level of performance on his present job.
25. Self-selection—men who prefer the work rhythms and characteristics of the present work method have self-selected into the job over time.
26. Anxiety that management will use the results of any experimental improvements to cut piece rate earnings.
27. Anxiety that an attempt to work on a new job in which they are not skilled results in some men "making fools of themselves."
28. Unwillingness to set new production norms before new levels of reward are negotiated and firmly established.
29. Feelings that the union has "sold out" to management.
30. Feelings that they are being manipulated by management.
31. Autonomy, variety, task identity, feedback, and social interaction on the present job are at the preferred level.
32. Approaching retirement—the individual may feel that his time remaining on the job is too short to undertake new experiences or responsibilities.
33. Pride of craft—the individual has identified with his work role, way of life, and established routines.

person and variables related to elements of the person's environment. Person-related variables that appear, or can be inferred, from Table 1 include attitude, authoritariansim, anxiety, ability, age, education, seniority, job involvement, and job satisfaction. Variables relating to the person's external environment are the group norm of legitimacy of participation and the structural variable, status. Additional relevant environmental variables appear to be related to the characteristics of the job itself, and include variety, autonomy, task identity, feedback, and hazard. Moreover, the demand characteristics of the task as determined by technology seem to be important determinants of behavior.

Finally, the content analysis taken together with inferences gleaned from the literature and the researcher's field notes provided the basis for the following hypotheses. A major premise underlying the predicted direction of the relationships is that workers, given freedom of choice, will tend to elect to engage in more satisfying, meaningful, and challenging work and to withdraw from jobs without those characteristics. Blumberg (1977) gives a detailed description of the evidence inferring the hypotheses.

Hypotheses

Hypotheses concerning variables relating to the person are:

H1: Job-switching behavior is negatively related to the individual's perceived level of job ability.

H2: Job-switching behavior is negatively related to the level of job involvement.

H3: Job-switching behavior is negatively related to the level of job-related anxiety.

H4: Job-switching behavior is negatively related to the individual's degree of authoritarianism.

H5: Job-switching behavior is negatively related to the level of job satisfaction.

H6: Job-switching behavior is negatively related to job seniority.

H7: Job-switching behavior is negatively related to age.

H8: Job-switching behavior is positively related to attitude toward job switching.

H9: Job-switching behavior is positively related to education level.

Hypotheses concerning variables relating to the environment are:

H10: Job-switching behavior is less frequent for those who perceive participation to be nonlegitimate than for those who perceive participation to be legitimate.

H11: Job-switching behavior is negatively related to the individual's rating of his job on the task dimensions of variety, autonomy, task identity, and feedback.

H12: Job-switching behavior is negatively related to the status of the individual's permanent job classification.

H13: The direction of job-switching is from low status to high status jobs.

H14: Job-switching behavior is positively related to the individual's rating of his job on the task dimension of hazard.

Research Setting and Subjects

The research site is a slope mine, employing about 200 people, located in the soft coal region of central Pennsylvania. The mine was organized by the United Mine Workers of America about 10 years ago. At the present time there are four operating sections in different geographical areas of the mine; each has three crews that rotate weekly through a three-shift work schedule. Two of the sections, each consisting of 27 miners and 3 foremen, are operated as autonomous work groups; two are operated in the traditional manner under the direct control of the section foreman.

The research sample consists of the 54 miners from the two autonomous sections. The all-male sample is comprised of 6 mine mechanics, 6 miner operators, 6 miner operator helpers, 12 shuttle car operators, 12 support men, and 12 bolter operators. All of the men in the sample were born in the United States, as were 87 percent of their parents. At the time of the study, 70 percent of the men were between the ages of 21 to 36. The remaining 30 percent ranged in age from 43 to 63. Their educational level ranges from 5 to 15 years with a mean of 11 years.

Observational data were collected over a period of 13 months from June 28, 1974, to July 8, 1975. During this time, the researcher spent approximately 800 hours underground observing and interviewing the miners while they worked. The questionnaire data were collected during the period from June 17, 1975, to July 8, 1975. The 76-item questionnaires were filled out inside the mine either at the "rectifier" or at the "dinner hole." In two cases, safety requirements did not permit the men to leave a co-worker alone at their work station, so the forms were completed at the man's work station while he worked.

Description of the Measures

Attitude Toward Job Switching—A 24-item Likert-type attitude scale was made up of a number of statements suggested by the literature search, interview, and observational information. Five response categories, scored from one to five, with the higher number indicating a more favorable attitude toward job switching, were established (Edwards, 1957; Scott, 1968). The internal consistency reliability for this scale indicated by Cronbach's (1951) alpha coefficient is .78.

Job Satisfaction Index—A 2-item job satisfaction index was used to tap the extent to which the miners are satisfied with their present jobs. The first item was a measure of the miner's satisfaction with his individual formal work role on the section. The second item was an indicator of pay satisfaction. The Spearman correlation between the two items was .50 ($N = 54$, $p < .01$).

Authoritarianism—A 3-item index borrowed from Sheppard and Herrick (1972) was used to tap the individual's degree of authoritarianism. Cronbach's alpha coefficient for this index was .50.

Job Status—Job status was operationalized by means of a three-question index adapted from Bishop and Hill (1971). The first question asked the miners to rank order the section's jobs in terms of their importance to the section's primary task of "loading coal." The second item asked for a ranking of each job in terms of the amount of skill thought necessary to perform it properly. The third question asked the men to rank the jobs in terms of the amount of intelligence thought necessary to do the job "the way it ought to be done." The index was scored by ranking the sum of the three item ranks for each job. The average interitem correlation for this index was .54.

Job-Related Anxiety—A 3-item index was constructed to tap the extent to which the miners felt nervous, anxious, or pressured on the job. The alpha coefficient for this index was .67.

Legitimacy of Participation—Legitimacy of participation was measured by a 2-question index adapted from French et al. (1960). The first question asked the miners to indicate on a 5-point Likert-type scale the extent to which they were able to exercise influence in making decisions about what equipment to operate and what procedures to use on the job. Possible responses ranged from "no influence at all" to "very strong influence." The second question asked on a 5-point scale how much influence they thought was "right and proper" for them to exercise.

These questions were used to establish a dichotomy: "legitimate" and "nonlegitimate." Those in the legitimate category were exercising influence at the *same* level they felt was right and proper. Those in the nonlegitimate category were exercising *less* than the amount of influence they felt was right and proper.

Core Dimensions—The extent to which the men felt their present jobs possess the characteristics of variety, autonomy, task identity, and feedback was tapped using Hackman and Lawler's (1971) 7-point scales. One additional characteristic relating to the extent to which an individual felt he must expose himself to possible bodily harm as he worked was developed. This scale was labeled "hazard" (see Blumberg, 1977). These scales were not combined into an index, but were treated as separate dimensions.

Job Ability Index—The extent to which different individuals believe they possess certain job-related abilities and/or knowledge was tapped by a 10-item index. The items of this index asked the individual to indicate on 7-point scales the extent to which he had the ability and/or knowledge to respond to the job characteristics of variety, autonomy, task identity, feedback, friendship opportunities, dealing with others, exertion of physical effort, exposure to danger, precision, and need to monitor the physical environment. Cronbach's (1951) alpha coefficient for this scale was .88.

Index of Job-Switching Behavior—As used here, job-switching behavior is defined as the extent to which the miners engage in work roles outside their regular job classification during their daily work shifts. Job-switching behavior was measured by means of a 2-item index completed by the section foremen for each of the nine men on their crews. The first item on the index asked the foreman to designate on a 5-point Likert-type scale the extent to which each individual switched jobs with the other men on the section. The possible responses on this scale ranged from "never" to "very often." The second item asked the foreman to list the jobs each man performed outside his regular classification along with the approximate number of hours per week spent on each. The number of jobs was multiplied by the number of hours to obtain the base value for the second item. This base value was then adjusted to a value between 0 and 5 by means of a linear transformation and summed with the first item to obtain the job switching index. The Spearman rank order correlation between the two index items was .63 ($N=54, p<.001$).

A second, objective measure of job switching was made by having the foremen keep an exact record of job switching for their men for a representative 10-day period. The Spearman correlation between the two independent measures of job switching was .83 ($N=6, p<.10$).

Job Involvement—Lodahl and Kejner's (1965) job involvement measure was used to tap the extent to which the men felt that the job was an important part of their psychological life or contributed to their self-image. The first item of the 20-item scale was deleted because it was judged inappropriate for use with union members. The alpha coefficient for this scale was .82. (Additional detail and copies of the scales can be found in Blumberg, 1977.)

RESULTS

Spearman correlations for the hypothesized relationships are summarized in Table 2. (Because some of the men were volunteers for the autonomous sections, strictly speaking the sample is not a random one and *p* values must be interpreted with caution.) Of the 14 hypotheses, 10 were supported as stated. Three others received partial support.

Variables Relating to the Person

Positive correlations were found relating job-switching behavior to level of education and attitude. Negative correlations were found relating job switching to authoritarianism, job satisfaction, seniority, and age.

The hypotheses relating job switching to job involvement, anxiety, and ability were not supported as stated. However, when the latter two variables were dichotomized at the median and the correlations recomputed, some significant patterns emerged. A $-.54$ correlation ($N=23, p<.01$) was found between job switching and anxiety for the higher anxiety subsample. No significant correlation was found for the lower anxiety miners. These results do not seem to come from bias in the measuring instrument or from the effect of some third variable, particularly age. When the sample was dichotomized at the median age, no significant difference was found in level of anxiety between the older and younger men. Nor did the correlation of $-.31$ ($N=24, p<.10$) found between ability and job switching for the older miners, and .20 ($N=30, p<.14$) for the younger miners appear to be a reflection of lower perceived ability on the part of the older miners. Their mean ability level was 57.44 on a scale of 7-70, compared

TABLE 2
Summary of the Hypothesized Relationships

Hypothesis	*Associated Variables*	*Spearman's Rho*	*N*	*p*
H1	Job switching			
	Ability	-.03	48	
	Higher ability	.07	20	
	Lower ability	-.31	28	.05
H2	Job switching			
	Job involvement	-.10	48	
H3	Job switching			
	Job related anxiety	-.07	48	
	Higher anxiety	-.54	23	.01
	Lower anxiety	-.02	25	
H4	Job switching			
	Authoritarianism	-.22 (-.02[a])	48	.10
H5	Job switching			
	Job satisfaction	-.37 (-.20[a])	48	.01
H6	Job switching			
	Job seniority	-.44 (-.08[a])	48	.01
H7	Job switching			
	Age	-.37	48	.01
H8	Job switching			
	Attitude	.27 (.21[a])	48	.05
H9	Job switching			
	Education level	.40 (.10[a])	48	.01
H10	Legitimacy of participation	[b]	19, 27	.10
H11	Job switching			
	Variety	.15	48	
	Autonomy	.13	48	
	Task identity	.26	48	.05
	Feedback	.22	48	.10
H12	Job switching			
	Job status	-.33	48	.05
H13	Direction of job switching	[c]	[d]	.001
H14	Job switching hazard	.30 (.20[a])	48	.05

[a] Partial product-moment correlation with effects of age partialed out.
[b] Mann-Whitney *U* test.
[c] Sign test.
[d] 190 observed instances.

with the younger miners' average ability level of 55.00. Thus, the older, more experienced miner tended to rate both his anxiety and ability at about the same level as did his younger counterpart, but at the same time he tended to engage in job switching less frequently. Correlations among all the variables are shown in Table 3.

Variables Relating to the Environment

Positive correlations were found relating job-switching behavior to job hazard, task identity, and feedback. A moderately higher level of switching was found for those who considered switching to be legitimate than for

TABLE 3
General Intercorrelation Matrix

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1. Job switching	—							
2. Ability	-.03	—						
3. Job involvement	-.10	.23*	—					
4. Anxiety	-.07	-.05	.05	—				
5. Authoritarianism	-.22*	.00	.25*	-.14	—			
6. Job satisfaction	-.37***	-.10	.20	.17	.31**	—		
7. Seniority	-.44***	.14	.54***	-.06	.47***	.29**	—	
8. Education	.40***	.11	-.46***	.00	-.48***	-.36***	-.60***	—
9. Age	-.37***	.14	.40***	-.17	.39***	.35***	.70***	-.43***
10. Attitude	.27**	.33**	-.10	.07	-.41***	-.51***	-.11	.40***
11. Variety	.15	.53***	.19	-.02	.02	-.19*	.15	.20
12. Autonomy	.13	.23*	-.07	-.18	-.10	-.39***	-.04	.22
13. Task identity	.26**	.00	.11	.07	.13	-.13	-.08	.00
14. Feedback	.22*	.34***	.31**	.21*	-.05	.23*	.16	.03
15. Hazard	.30**	-.16	-.02	.13	-.13	-.07	-.25*	-.03
16. Status	-.33**	-.03	.11	.19*	.07	.10	.22*	-.36***
17. Absenteeism	.15	-.11	-.44***	.00	-.29**	-.09	-.34***	.26**

	9	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*
9. Age	—								
10. Attitude	-.20	—							
11. Variety	.12	.27**	—						
12. Autonomy	-.02	.42***	.08	—					
13. Task identity	.05	-.06	.04	.10	—				
14. Feedback	-.09	.14	.31**	-.11	-.08	—			
15. Hazard	-.34***	-.22*	-.07	-.09	.18	.13	—		
16. Status	-.03	.19	-.35***	.01	.03	.11	.29**	—	
17. Absenteeism	-.33**	.01	-.10	-.01	-.04	.09	.15	.13	—

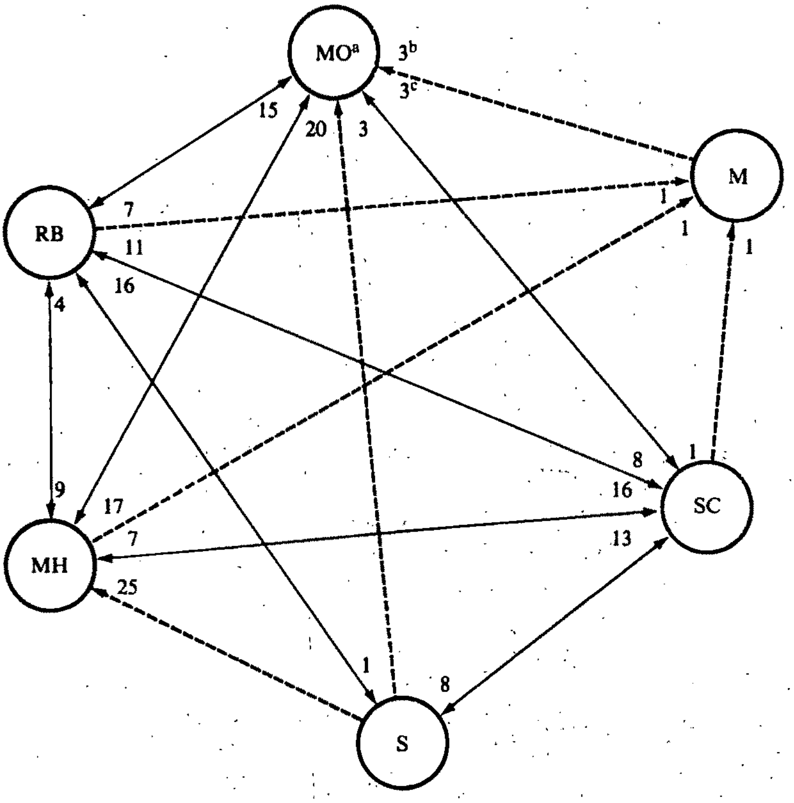
*$p<.10$
**$p<.05$
***$p<.01$

those who considered switching to be nonlegitimate (Mann-Whitney *U* Test, $p<.10$, Siegel, 1956). A negative correlation was found between job switching and job status. No significant relationship was found between job switching and either variety or autonomy.

To test the prediction of Hypothesis 13 that the direction of job switching is from lower to higher status jobs, the researcher had asked the section foremen to keep an exact record of job switching among men on their crews for a representative 10-day period. During this time, the 6 section foremen observed a total of 190 instances of job switching. Of these 190 instances, 132 (70 percent) were from lower status to higher status jobs, and 58 (30 percent) instances of switching were from higher status to lower status jobs (Sign Test, $p<.001$, Siegel, 1956).

When the data are placed in a sociogram-type format, some patterns of job switching can be inferred. In Figure 1, the direction of switching is suggestive of a flow of people "step-by-step" from lower status to higher status jobs. In "forward switching," the support men most frequently switch to the miner helper position, their next higher status job. The shuttle car operators most frequently switch to the bolter position, their next higher status job; and the roof bolters most frequently switch to miner operator, their next higher status job.

FIGURE 1
Direction and Frequency of Job Switching for 190 Observed Instances



MO—Miner operator
RB—Roof bolter
MH—Miner operator helper
M—Mechanic
SC—Shuttle car operator
S—Support

[a] Vertical location indicates relative status of position.
[b] The number next to the arrowhead indicates frequence of switching into this position.
[c] Solid lines indicate reciprocated switching; dotted lines indicate one-way switching.

The miner helper job, at first inspection, appears to be an exception to the pattern. The miner helper is ranked next to the last in overall status, yet most frequently switches with the miner operator, the highest status job. However, very likely this occurs because of provisions of the labor agreement that mandate that the miner helper must operate the continuous mining machine four hours per day in order to keep "high rate" (top pay grade). Moreover, the pattern of step-by-step job switching seems to hold when it is noted that the miner helper switches to shuttle car operator, his next higher status job, almost as frequently as to miner operator.

The tendency, although less clear, is evident in the backward switching direction. Except for the contract-mandated switching with the miner helper, the miner operator switches most frequently with the roof bolters;

the roof bolters about equally with the miner helper and shuttle car operators; and the shuttle car operators about equally with the support men and miner helpers. In sum, the data suggest that the preponderence of switching is from lower to higher status jobs. Moreover, when switching occurs in either direction, it tends to take place only one or two status levels at a time rather than between the extremes of the status hierarchy.

Emergent Findings

A better understanding of the general pattern of job switching began to emerge when it was examined together with employee absenteeism data obtained from company records. A Spearman rank order correlation of .88 ($N=6$, $p<.05$) was found relating average man-days of absence by position, and the number of times that position was switched into. The most frequently absent men were the miner operator helpers, followed by the roof bolters, and shuttle car operators. When absent, these men usually are replaced by one of the two support men. If both support men are absent on the same day as the helper, one of the two shuttle car operators will be "pulled off" his machine to "fill in" for the absent helper, and the section will continue to operate, although at reduced efficiency. The researcher was able to determine two basic reasons for this sequence of switching.

In the mines, there is a long-standing tradition of a man and his "buddy" who work together, responding to task demands and providing both psychological support and a check on each other's safety. In addition to being prescribed by tradition, two sets of buddies, the miner operator and his helper and the two roof bolters, are mandated by the labor agreement. These men work at the coal "face" where the newly exposed, unpredictable roof of the mine presents constant danger. If a face worker is absent, he must be replaced or the mine safety committee can "shut the section down." Thus, an important determinant of job switching in the mine appears to be the absence of a miner whose job has a high degree of criticality in the work flow network or whose job must be filled for safety reasons.

An additional dimension affecting the miners' job-switching behavior seems to involve the amount of pressure felt by the men to achieve high levels of production. Although there had been a six-week moratorium on pressure for production during the initial phases of the new section, once this period had passed there was constant pressure from top management to attain normal levels of production. One of the first questions the superintendent would ask when he saw the men at the end of the day shift was "How'd ya do?" If production was not particularly good that day, the superintendent frequently would verbalize what appeared to be a widely shared value among the miners that all of their jobs depended on "loading coal," and although occasional bad days were understandable, they couldn't expect to continue getting paid if they didn't load any coal.

A number of occasions were observed when the men seemed able to switch jobs but would not do so because they had encountered bad physical conditions in the mine. During these periods, the miners seemed to share an understanding that only the most skilled and experienced miners would operate the equipment. This way they were able to obtain the best production possible for the conditions while minimizing the danger to the men. On one occasion, a crew deviated from this procedure and allowed a less experienced man to operate the continuous miner in "bad roof." The roof unexpectedly "came in," burying the machine and very nearly trapping the operator and helper. It took the men a week of back-breaking hand digging and blasting to recover the equipment. Not too surprisingly, this incident somewhat dampened the enthusiasm of the men for job switching.

Eventually, the men were able to resolve the necessity to "load coal" with their desire to learn new skills and switch jobs by the strategy of "getting their coal" early in the shift. The researcher had become accustomed to seeing the miners work a steady, rhythmic pace allocating their physical energy over the work shift. On one particular day the men seemed to be working much faster than usual. When the researcher asked what was going on, a roof bolter replied: "We couldn't work this fast all the time or we'd burn ourselves out before very long. But some of the men want to work on new jobs later in the turn, so we're trying to get our coal early."

The Most Important Predictors

In an attempt to find the most parsimonious set of predictors of job-switching behavior, the observed relationships were reexamined using both partial correlation analysis and multiple regression analysis.

TABLE 4

Stepwise Regression of the Variables on Job Switching

Variables in the Equation	*R*	*R^2*	*Increase in R^2*	*B*[a]	*Beta*[b]	*Standard Error B*	*F*
Age	.410	.168	.168	−.033	−.234	.019	3.177*
Status	.498	.248	.080	−.435	−.389	.129	11.341***
Task identity	.581	.337	.090	.361	.248	.166	4.767**
Feedback	.643	.413	.076	.348	.317	.127	7.495***
Hazard	.674	.454	.041	.253	.238	.129	3.841**
Job satisfaction	.707	.500	.021	−.267	−.250	.138	3.766**
(Constant)				3.576			

Analysis of variance	*df*	Sum of Squares	Mean Square	Overall *F*
Regression	6	74.876	12.479	6.822**
Residual	41	75.000	1.829	

[a] *B* is the nonstandardized partial regression coefficient.

[b] Beta is the standardized partial regression coefficient.

*$p < .10$

**$p < .05$

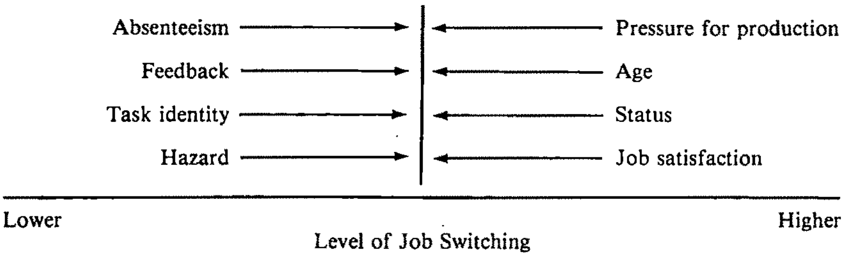
***$p < .01$

The results of the regression analysis, summarized in Table 4, indicate that six measures—age, status, task identity, feedback, hazard, and job satisfaction—are linearly related to job switching. The multiple R of .71 implies that these variables account for about 50 percent of the total variance in job switching behavior. When the multiple regression analysis is compared to the partial correlations shown in Table 2, it appears that age is an important component of authoritarianism, job seniority, and level of education.

Job satisfaction, attitude, and hazard are moderately related to job switching even with age partialed out, although attitude did not enter the regression equation.

In summary, it appears that the most potent forces acting in the individual's decision to engage in higher levels of job switching are related to the task characteristics of the task identity, feedback and hazard. The most important forces acting to lower the level of job switching are related to the variables of age, status, and job satisfaction. A force field representation (Lewin, 1938) of these variables is shown in Figure 2. Also included are the emergent variables, absenteeism, which tends to increase job switching, and pressure for production, which tends to lower it.

FIGURE 2
A Force Field Representation of the Variables Related to Level of Job-Switching Behavior



DISCUSSION AND IMPLICATIONS

Much of the behavioral literature concerned with job design has tended to focus on the behavior *permitted* by the work activity to the exclusion of the behavior *required* by the work activity. This research emphasis has resulted in the analysis of social and psychological variables apart from their contextual significance and has tended to ignore the very real constraints that the technology of the workplace and the actions of significant others impose on the choices made by able and willing workers.

Although social and psychological variables have been found to be prime determinants of behavior in other work systems, additional potent forces appear to be at work in the mine. Here, the picture remained incomplete or even erroneous until job switching was examined together with employee absenteeism. This analysis emphasized that in addition to individual differences, the work behavior of the miners responds closely to the insistent and continuing "pull" of the technical system.

The technical system appears to exert its influence on the behavior of the men most strongly when a higher status member is absent. When this occurs, and other trained men whose tasks can be deferred are available, there is no question that job switching will take place.

Nature of the Impact of Age

Job switching is engaged in primarily by the younger men, and the movement is toward the higher status jobs, i.e., jobs having higher degrees of criticality for the work system. No correlation was found between age and status (see Table 3), i.e., the older men do not tend to hold the higher status jobs in the section that generally requires sustained high levels of physical activity, a high degree of vigilance, and the ability to operate or maintain heavy equipment. The older men, particularly as they are nearing retirement, tend to avoid these positions in favor of jobs in which their years of experience, their ability to "read" the roof, and the chance to pace themselves allow them to compensate for any diminution in physical capacity.

On the other hand, a recurring theme in remarks made by the younger men is the anticipation of 30 or more years "underground." Many of them are interested in acquiring additional skills in order to find new employment more easily when the mine becomes "worked out" and closes down in about 10 years.

If also seems possible to speculate that lower levels of job switching among older workers may be related to their self-concept (see Sherif & Sherif, 1969). Both Trist et al. (1963) and Herbst (1974) have noted in connection with their coal-mining studies that the men tended to take on the character of the jobs they performed: "Thus the person who is engaged as a filler becomes identified as a filler and is no longer perceived as a person who can carry on other types of work" (Herbst, 1974, p. 149). Presumably, the longer a man has occupied a job, the more closely he would come to identify with it and the more reluctant he would be to switch to other jobs. Several capable and experienced men stated to the researcher in this connection that they would "feel foolish" trying to operate machinery on which they had little experience or skill. On the other hand, the younger miner, without as well-established an image as a "good man," or "top operator," presumably would be less threatened if he were to switch to a job for which his prior experience had little utility.

Nature of the Impact of Status

The importance of status for job switching seems to derive from several sources. The first of these is related to the experimental design itself. One important condition set down by the union for conducting the experiment was that the basic provisions of the labor agreement with regard to wages and payment, retention of job rights, grievances, and safety would not be abrogated. Thus, it was not possible to take away the primary job classification of the men. This in itself may have led to low job switching which, in turn, reinforced existing status differences.

There also is some evidence suggesting that some of the men holding higher status jobs felt threatened when some of the other men wanted to learn "their" job. A 21 year-old miner operator commented to the researcher in this connection: "I think a man who bid on a job and has been here a long time should be able to stay on that job if he wants to. A man that's just started should not start at the top. I know I didn't, I worked my way up." A 34 year-old miner helper told the researcher: "The men don't switch more because they are basically jealous of their own jobs. They don't want to get stuck with a job they don't like. They don't want other men to get as good as they are...it's an ego thing."

In one case, several of the men wanted to learn to operate the continuous miner. The incumbent operator not only resisted training them, but also hurried to get on the equipment at the beginning of the shift and then refused to get off long enough for another competent former operator (the section mechanic) to train the men. The operator held that conditions were too bad, or there was too much push for production to permit new men to be trained. The men in turn asserted that the operator was scared for his job, and afraid that the new operators would show him up. The conflict was eventually resolved at a meeting of the group when the operator volunteered to move to a support position and allow the miner helper to train the men.

Job Switching and Task Characteristics

Lack of correlation of job switching with variety and autonomy and the positive correlation of job switching with task identity and feedback comes as somewhat of a surprise. This result is not logically consistent with other research which generally has found positive relationships between these core dimensions and measures of employee motivation, performance, satisfaction, job involvement, and attendance (Hackman & Lawler, 1971; Wanous, 1974; Griffin & Chonko, 1977). Thus, the expected movement of employees would be from less desirable, i.e., lower core dimension jobs, to more desirable, higher core dimension jobs.

A number of possible explanations for this result were investigated and discarded, including the possibility that the correlations are spurious and result from requirements of the technical system or the labor agreement. The most plausible explanation to emerge from this analysis follows directly from the work of Hackman and Lawler (1971), which first demonstrated the importance of individual higher order need strength as a moderator between job characteristics and employee attitudes and behavior. Individuals differing in higher order need strength tend to have strikingly different correlations between the core dimensions and both their attitudinal and behavioral responses (Hackman & Lawler, 1971; Wanous, 1974).

Thus, it seems possible that the lack of correlation of job switching with variety and autonomy stems from a comparatively low need strength on the part of the miners relative to these job characteristics.

The positive correlation of job switching with task identity and feedback could also be explained in terms of the need strength of the miners. It seems possible that under the conditions of the field experiment, the needs of the men relative to these task characteristics became, in some cases, "too satisfied." Lewin (1951) has postulated that many needs that continue to be satisfied beyond satiation will become *oversatiated* and the individual will experience an aversion for a formerly desired goal.

Although no direct measure of need strength was taken, there is some indirect evidence to suggest that some of the miners were receiving as much of the core dimensions as they wished. For example, one of the questionnaire items was open-ended and asked the men what they thought of job switching. A 61 year-old roof bolter responded: "I'm not against it, but I'm at the phase of life when I don't want to. . . ." A 21 year-old shuttle car operator stated: "It is only practical to change jobs if the person is not pressured to learn a new job but can learn the new job at his own pace." Finally, a 36 year-old foreman stated: "It might help from being bored. . . for those who get bored." If this line of argument is correct, it seems necessary to question the implicit assumption of many work design experiments that "more" is always better where the core dimensions are concerned. Obviously, much more research is needed concerning the relationships between task characteristics and individual need strength before any firm conclusions can be drawn.

Implications for Organizational Practice

Perhaps the most immediate implication of these findings is that the adverse effects of age and status need to be explicitly addressed in the design of autonomous work groups. First, it seems necessary to provide a *path for job switching* for those who wish to switch jobs. For example, if there are two older men who operate a piece of equipment, and neither of them wishes to switch jobs, there is no effective path to that equipment. Similarly, if an equipment operator is unwilling to allow others to learn his high-status job, then the path to that job is blocked.

Work group designers can provide job switching paths through the assignment of men to tasks such that at least one man is both willing and capable of job switching. In addition, during the design of jobs, care should be taken to minimize status differences by providing some minimum level of job switching and avoiding the assignment of workers to a primary job classification. Consideration should also be given to equalization of the critical tasks among work stations and the avoidance of attaching rewards primarily to a job classification.

Finally, the impact of age on job-switching behavior implies that autonomous working is not a panacea. As the work force ages and technological complexity increases, an age-contingent theory of work will become increasingly important to work designers.

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Relationships of Personality to Perceptual and Behavioral Responses in Stimulating and Nonstimulating Tasks

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This study tested the interaction effects of task stimulation and extraversion on worker satisfaction and performance. In addition, the role of extraversion and neuroticism dimensions of personality on expectancy and task perceptions of workers was investigated. Among other findings, the task-extraversion interaction hypothesis was confirmed for worker satisfaction, but not for performance.

It has been argued among psychologists that perceptual and behavioral responses are not solely organized or triggered by structural characteristics of a stimulus. Further, human beings either inherit or develop characteristic modes of adapting or responding to environmental stimulus, and such adaptation orientations tend to vary among individuals. In recent years, task design as a means to provide positive task stimulation for workers increasingly has been emphasized. Researchers on task design tend to agree that not everyone reacts positively to the "enriched" tasks, but a considerable disagreement exists over what these individual differences may be. Some of the suggested individual differences include urban/rural background (Hulin & Blood, 1968), growth need strength (Hackman & Lawler, 1971; Hackman & Oldham, 1975), and Protestant work ethics (Blood, 1969). Research findings on these variables as moderators reveal the mixed results such as those by Brief and Aldag (1975) and Schuler (1977).

Two personality variables relevant for task design appear to be extraversion and neuroticism, formulated by Eysenck (1957, 1967). According to Eysenck (1967), extraversion and neuroticism are independent dimensions of personality and are biologically based. The Eysenck's formulation of extraversion was in part derived from Hull's "reactive inhibition hypothesis." According to Hull (1943), whenever a stimulus-response connection is made in an organism, a simultaneous reaction occurs in the nervous structure which inhibits recurrence of the activity in question. This negative reaction is termed "reaction inhibition." Eysenck (1973) argued that the amount and speed with which this reactive inhibition is produced and dissipated would be proportional to the position of the individual on the extraversion-introversion continuum. Extraverted individuals are characterized by a *quick* generation of reactive inhibition, *strong* reactive inhibitions, and a *slow* dissipation of reactive inhibition. On the other hand, introverted individuals are characterized by a *slow* generation of reactive inhibition, *weak* reactive inhibitions, and a *quick* dissipation of reactive inhibition. (The terms introverts and extraverts have been used here for purposes of convenience. It should be noted that the extraversion–introversion continuum reflects the degree of extraversion.) Due to these predispositions, extraverts, as compared to introverts, tend to be habitually in a state of lower arousal, have a higher sensory threshold, and consequently seek for stronger external sensory stimulation. Conversely, introverts tend to be more often concerned with reducing stimulation from the environment (Eysenck, 1967; Hamner & Organ, 1978). Eysenck further argued that his formulation of extraversion accounting for various patterns of behavior can be extended to explain perceptual phenomena (Eysenck, 1973).

Research findings on extraversion as related to worker responses and perceptual reactions to work environment produced inconclusive results. For example, extraverts, as compared to introverts, have been shown to report a greater tendency to engage in self-stimulating activities (Bakan, Belton, & Toth, 1963), to demonstrate less stimulus deprivation tolerance in a laboratory setting (Petrie, Collins, & Solomon, 1960), and in a situation among female employees in a tobacco factory to withdraw from a repetitive task (Cooper & Payne, 1967). Among employees in three different types of industrial organization, Kahn and Wolfe (1964) found that, under a given role pressure, the perceived amount of tension, trust, and respect people experienced with their associates varied with the degree of extraversion, with the introverted persons showing more tension and less trust and respect for associates under high pressure. Rim (1977) also found results among college students which showed that people's perceptions on the degree of significance of their work were influenced by extraversion. On the other hand, Smith (1955) found no support for the hypothesis that the extraverted are more susceptible to experiencing monotony in repetitive tasks among knitwear mill operators. Similarly, Hill (1975) found no relationship between extraversion and amount of boredom experienced by workers engaged in simple, repetitive tasks among industrial workers.

The second dimension of personality that appears to be relevant for task design research is neuroticism. It has been suggested that neuroticism represents an individual difference regarding emotional arousability of certain people as compared with others. Thus, people with high neuroticism are characterized by a higher degree of sensitivity to environmental stress, a lower self-esteem, a higher degree of tension experience, and so on (Eysenck, 1965; Hamner & Organ, 1978). Research findings on neuroticism as related to the reactions to work environment also produced inconsistent results. Kahn and Wolf (1964) found that people with high emotional sensitivity, as compared to those with low emotional sensitivity, perceived substantially higher tension for any given degree of objective conflict among workers in industrial organizations. Organ (1975) found similar results but only under the unstructured task conditions among college students. Hill (1975) found neuroticism to be negatively related with the degree of boredom experienced in simple repetitive tasks among female industrial workers. On the other hand, Smith (1955) found no relationships between people's neurotic tendencies and the feelings of monotony in repetitive task in a knitwear plant.

Most of the studies reviewed above have investigated the role of extraversion and neuroticism on criterion variables under simple or adverse stimulus conditions such as repetitive tasks or conflicting role situations. However, as Eysenck (1965) suggested, it may be possible that similar or different effects may be produced by personality dimensions, depending on the nature of external stimulation. Therefore, whether or not these personality dimensions affect the nature of perceptual and/or behavioral responses under more complex and favorable stimulus conditions has remained unanswered. Further, due to the absence of systematic variation on experimental tasks in these studies, the nature of potential interactions between task and personality variables, especially when task is enriched, could not be assessed. Recently, Baird (1976a, 1976b) and Ivancevich (1978) found the performance-satisfaction relationships to be significantly different for the two categories of jobs varying on task stimulation.

Further, Schwab and Cummings (1976) argued that people's reactions to task should be conceived in terms of variations on individual characteristics, task-based stimulation, and their likely interactions. Along this same line of argument, Hamner and Organ (1978) suggested that the nature of the task to be performed may interact with the extraversion dimension of personality in terms of worker responses. Specifically, they suggested that the positive impact of stimulating tasks, which provide variations for sensory stimulation, will be higher among extraverts than among introverts. On the other hand, the negative impact of nonstimulating tasks, which offer little sensory stimulation, will be less among introverts than among extraverts.

With respect to the role of personality on people's perceptions of task, Lawler (1971, 1973) argued that although the single most important determinant of a person's expectancy is the objective task contingencies in the work environment, personality of the perceiver can influence one's expectancy to diverge from reality. Lied and Pritchard (1976) found among Air Force subjects in a technical training program that the perceptual components of expectancy theory, although obviously a function of contingencies in the environment, are also influenced by the personality structure of the individual, such as locus of control and Protestant ethic values. Schwab and Cummings (1976) suggested that the relationships between objective task scope and variability in people's perceptions of task (i.e., expectancy, the perceived amount of variety, autonomy, etc.) may be moderated by individual differences such as cognitive complexity and adaptation level.

Eysenck (1967) and Bieri (1971) suggested that individuals with a low cognitive complexity were inclined to display less neurotic and more extraverted tendencies. The extent to which these arguments of Schwab and Cummings (1976) and Bieri (1971) are valid, one may expect that there will be differential perceptions of objective task, depending on one's extraverted and neurotic tendencies. At the present time, research addressing the moderating effect of personality on the relationships between objective task and people's perceptions of task is nonexistent (Schwab & Cummings, 1976).

It is this issue to which this research is addressed. That is: (1) Does the nature of task stimulation interact with the extraversion dimension of personality in terms of affective and behavioral response? (2) Do extraversion and neuroticism moderate people's perceptions of expectancy and task characteristics?

HYPOTHESES

For the first research question suggested above, the following two hypotheses were formulated.

H.1: The introverted individuals will be less dissatisfied than the extraverted individuals in a nonstimulating task, whereas the extraverted individuals will be more satisfied than the introverted individuals in a stimulating task.

H.2: The introverted individuals will perform better than the extraverted individuals in a nonstimulating task, whereas the extraverted individuals will perform better than the introverted individuals in a stimulating task.

For the second research question suggested above, due to limited theoretical conceptualization and conflicting empirical evidence, no specific hypotheses under each task condition were offered. Instead, the following exploratory hypotheses were formulated.

H.3: The extraverted individuals and the introverted individuals will differ in their perceptions with respect to expectancy and motivating characteristics of objective task.

H.4: The high-neuroticism individuals and the low-neuroticism individuals will differ in their perceptions with respect to expectancy and motivating characteristics of objective tasks.

These two hypotheses were tested in the stimulating and the nonstimulating task, independently.

METHOD

Subjects

The sample for this study consisted of 96 undergraduate students enrolled in 3 different sections of an introductory course on organizational behavior in a midwestern university. The course enrollment is open to juniors and some seniors regardless of their majors. Classes were about 75 percent male and 25 percent female. Because the three classes were very comparable in terms of age and sex composition, they were combined for the purpose of data analysis.

Procedure

During the third week of the quarter, all students took the Eysenck Personality Inventory (Eysenck & Eysenck, 1965) as a course exercise dealing with individual differences. The following week, half of the students in each of the personality types were randomly assigned to a "numerical exercise"—nonstimulating task—and the other half to an "in-basket exercise"—stimulating task. These exercises were developed by Baird and have been perceived as providing significantly different degrees of motivating characteristics by subjects in two previous studies (Baird, 1976a; Baird & Kim, 1976). The numerical exercise, consisting of 36 simple arithmetic problems, was designed to be *low* in motivating characteristics such as task identity, variety, and autonomy. This was done by (1) giving problems that were parts of a larger project, (2) presenting only problems requiring the same conceptual skills, and (3) fixing the sequence of the problems. Thus, the numerical exercise was labeled a nonstimulating task in this study. On the other hand, the in-basket exercise, consisting of 17 items, was specifically designed to be ***high*** in motivating characteristics. This was done by (1) presenting three complete organizational problems to be solved in the task, (2) varying the issues to be resolved, and (3) giving the participants total discretion for the decisions. Thus the in-basket exercise was labeled a stimulating task.

Students were given 30 minutes to complete the exercises. For the in-basket exercise, participants were asked to play the role of a top level manager in a consulting firm and to write a brief description of the action they would take for each in-basket item. After this, a post-task questionnaire was administered, followed by a debriefing session. During the debriefing session participants indicated they had had no previous experience with in-basket exercises, nor had they been aware of the purposes of the study.

Measures

Three measures were obtained by a post-task questionnaire. The perceptions on motivating characteristics of task were measured by the Job

Diagnostic Survey (JDS) developed by Hackman and Oldham (1975). The only modification made in this instrument for this study was to change the term "job" to "task." Following the conceptual framework developed by Hackman and Oldham (1975), the motivating potential score (MPS) was computed as follows:

$$\text{MPS} = \frac{\begin{matrix}\text{Skill}\\ \text{Variety}\end{matrix} + \begin{matrix}\text{Task}\\ \text{Identity}\end{matrix} + \begin{matrix}\text{Task}\\ \text{Significance}\end{matrix}}{3} \times \text{Autonomy} \times \text{Task Feedback}$$

Estimated internal reliabilities (Cronbach's alpha) for this sample were .83 for skill variety, .63 for task identity, .74 for task significance, .73 for autonomy, and .76 for task feedback.

Expectancy was measured by five items taken from the expectancy scale originally developed by House and Dessler (1974). This measure is a Likert-type scale with responses ranging from 1 (very inaccurate) to 5 (very accurate). Sample items are as follows: (1) Trying as hard as I can leads to a high quantity of work in this task, and (2) Doing things as well as I am capable leads to high quality work in this task. Estimated internal reliability of this scale was .81 for this sample.

Task satisfaction was measured by a 5-item Likert-type scale developed for this study. Subjects were asked to rate their degree of satisfaction (1, very dissatisfied, to 5, very satisfied) on the following aspects of task: (1) the feeling of worthwhile accomplishment; (2) the amount of independent thought and action; (3) the amount of challenge; (4) the amount of enjoyment; and (5) the overall satisfaction. Estimated internal reliability of this scale was .94 for the sample.

In addition to task satisfaction, expectancy score, and the motivating potential score, a performance measure for each subject was obtained. For numerical exercises, the number of correct answers was used as the performance measure. For those engaged in in-basket exercises, performance measure was provided by two independent raters: a professor in organizational behavior and a graduate student in communication at a midwestern university who was specifically trained for this study.

Raters scored the in-basket exercise independently using a 5-point Likert-type scale (1, very poor, to 5, very good) on each of the following five dimensions: use of delegation, management control, sensitivity, planning and organization, and decisiveness. For example, use of delegation as a performance dimension covered job related behaviors such as (1) amount of delegation, (2) clarity of delegation, (3) appropriateness in the choice of people being delegated, and (4) appropriateness of communication of delegation to recipient. Similarly, planning and organization as a performance dimension covered the subjects' responses on (1) the way in which subject approached the problems in an organized or random manner, (2) consideration given to priority items, (3) use of reference material, (4) use of calendar for scheduling, etc. These five dimensions of in-basket performance, originally developed at AT&T, were adopted for this study because they have been known to demonstrate a high validity in predicting managerial effectiveness (Bray, Campbell, & Grant, 1974).

In this study, the five dimension scores were summed for a total score, the final performance measure being the average of the two independently obtained total scores. The interrater reliability was .71. In order to develop a comparable performance measure for the numerical and in-basket exercises, performance scores were standardized through Z-transformation for each exercise, respectively.

For the data analysis, subjects were divided into three groups based on their extraversion and neuroticism measured by the Eysenck Personality Inventory. Thus, those scoring in the upper one third (a score of 16 or more) of the distribution of extraversion scores were classified as the extraverted and those in the lower one third (a score of 12 or less) as the introverted. Similarly, those scoring in the upper one third (a score of 11 or more) of the distribution of neuroticism scores were classified as high-neuroticism individuals and those in the lower one third (a score of 7 or less) as low neuroticism individuals. Because it has been suggested that the differences between high and low extraversion and between high and low neuroticism individuals may not be apparent unless one compares groups at opposite ends of the distribution (Hamner & Organ, 1978), subjects scoring in the middle one third were excluded from the analysis. Thus, a total of 67 subjects were analyzed in a 2×2 factorial design (task by extraversion) to test the first 2 hypotheses, and a total of 68 subjects were analyzed in a series of planned comparisons to test the remaining 2 hypotheses.

RESULTS

In order to check the experimental manipulation, one-way analysis of variance for all subjects was conducted for task stimulation using MPS as a criterion variable. The experimental attempt to vary the motivating characteristics by employing the numerical and the in-basket exercises was found to be successful. The average MPS for those engaged in the numerical exercise was 22.66 as compared to 70.68 for those engaged in the in-basket exercise. This task effect was highly significant: $F(1, 94) = 112.59$; $p < .001$.

To test the interaction hypotheses (H.1 and H.2), a 2×2 analysis of variance was conducted for each of the two dependent variables, task satisfaction and performance. Table 1 presents the means and standard deviations for task satisfaction reported and standardized performance measure obtained by the subjects. As expected, a significant main effect of task on satisfaction ($F(1, 63) = 166.97$; $p < .001$) was observed. The subjects engaged in the nonstimulating task were more dissatisfied than were those with stimulating task. However, the introverted subjects reported less dissatisfaction than did the extraverted subjects in the nonstimulating

TABLE 1
Means and Standard Deviations of Satisfaction and Performance for the Introverted and the Extraverted Under Stimulating and Nonstimulating Task Conditions
($N = 67$)

Dependent Measures		*Nonstimulating Task* Introverted ($N = 16$)	*Nonstimulating Task* Extraverted ($N = 15$)	*Stimulating Task* Introverted ($N = 17$)	*Stimulating Task* Extraverted ($N = 19$)
Satisfaction[a]	M	2.78	1.85	3.87	4.12
	SD	.68	.73	.55	.45
Performance[b]	M	-.03	.16	.29	-.21
	SD	.80	.87	.83	.97

[a] The higher the score, the higher the satisfaction.
[b] Standardized performance measures; the higher the scores, the better the performance.

TABLE 2
Summary of Analysis of Variance on Task Satisfaction for the Introverted and the Extraverted Under Two Task Conditions
($N = 67$)

Source	*DF*	*MS*	*F*
Task	1	62.04	166.97**
Extraversion	1	.06	.18
Task × extraversion	1	1.85	4.97*
Residual	63	.37	

*$p < .05$
**$p < .01$

task, whereas the extraverted subjects were more satisfied than were the introverted subjects in stimulating task. As shown in Table 2, this interaction effect was found to be statistically significant.

Additional analysis for simple main effects revealed that the task effect on satisfaction was significant for both the introverted and the extraverted subjects and the extraversion effect on satisfaction was significant in nonstimulating task ($F(1, 63) = 18.08$; $p < .01$), but not in stimulating task ($F(1, 63) = 1.48$; n.s.). Further, it was found that over 71 percent of the total variance for task satisfaction was explained by the linear combinations of task, extraversion, and task-extraversion interaction.

The stated hypothesis regarding performance (Hypothesis 2) was not confirmed. Contrary to the predictions, the introverted subjects tended to perform better in a stimulating task than did the extraverted subjects, whereas the extraverted subjects performed better than the introverted subjects in the nonstimulating task. However, neither main effects nor interaction effects were found to be statistically significant.

Regarding the second research issue, it was hypothesized that perceptions with respect to expectancy and motivating characteristics of tasks will be different between the extraverted and the introverted and between high-neuroticism individuals and low-neuroticism individuals, even when they engage in an identical task. To test these hypotheses, a priori specification of cell means to be contrasted under each task condition was established. Using expectancy score and motivating potential score (MPS), a series of *F*-tests was conducted between the extraverted and the introverted and the high-neuroticism individuals and the low-neuroticism individuals under each task condition. Table 3 presents the means and the standard deviations of expectancy and MPS for the specified cells to be contrasted (Contrast 1: the introverted versus the extraverted under the nonstimulating task; Contrast 2: the introverted versus the extraverted under stimulating task).

TABLE 3
Means and Standard Deviations of Expectancy and MPS for the Specified Cells to be Contrasted Between the Introverted and the Extraverted Under Two Task Conditions
($N = 67$)

		Nonstimulating Task		*Stimulating Task*	
Dependent Measures[a]		*Introverted (N = 16)*	*Extraverted (N = 15)*	*Introverted (N = 17)*	*Extraverted (N = 19)*
Expectancy	M	3.30	3.70	3.43	4.00
	SD	.65	.85	.72	.61
MPS	M	20.62	22.13	67.72	74.38
	SD	15.62	23.57	30.68	21.34

[a] The higher the score, the higher the expectancy and MPS.

As shown in Table 3, the extraverted subjects tended to show higher perception scores than did the introverted for expectancy and MPS. Yet, the differences in expectancy and MPS under the nonstimulating task condition were not statistically significant. Under the stimulating task condition, expectancy perception of the extraverted was significantly higher than was the same measure of the introverted: $F(1, 34) = 5.63$; $p < .02$, whereas the difference in MPS for the same subjects did not reach the statistically significant level. Thus, Hypothesis 3 was only partially supported under stimulating task condition. That is, when subjects engaged in stimulating task, the extraverted tended to perceive a higher degree of expectancy as compared to the introverted, even though both the extraverted and the introverted performed the identical task.

Table 4 presents the means and standard deviations of expectancy and MPS for the specified cells to be contrasted (Contrast 1: the low-neuroticism individuals versus the high-neuroticism individuals under the nonstimulating task; Contrast 2: the low-neuroticism individuals versus the high-neuroticism individuals under the stimulating task). Under the nonstimulating task condition, no statistically significant differences in expectancy and MPS were observed between the low-neuroticism individuals and the high-neuroticism individuals. However, under the stimulating task

TABLE 4
Means and Standard Deviations of Expectancy and MPS for the Specified Cells to be Contrasted Between the Low-Neuroticism Individuals and the High-Neuroticism Individuals Under Two Task Conditions
($N = 68$)

Dependent Measures		*Nonstimulating Task*		*Stimulating Task*	
		Low-Neuroticism (N=12)	*High-Neuroticism (N=22)*	*Low-Neuroticism (N=20)*	*High-Neuroticism (N=14)*
Expectancy	M	3.55	3.50	3.85	3.37
	SD	.86	.68	.56	.57
MPS	M	21.90	22.40	76.29	61.33
	SD	11.86	15.46	28.03	22.94

condition, the low-neuroticism individuals, as compared to the high-neuroticism individuals, perceived a significantly higher degree of expectancy ($F(1, 32) = 4.27$; $p < .04$) and MPS ($F(1, 32) = 4.20$; $p < .04$). Thus, Hypothesis 4 was confirmed under the stimulating task condition but not under the nonstimulating task condition.

CONCLUSION AND DISCUSSION

It has been widely assumed in current literature that people's perceptual reactions determine to a large extent their affective and behavioral reactions. Following this assumption, researchers on task design have essentially treated people's expectancy perception and perceptions of task characteristics as independent variables from which a set of criterion variables are to be predicted. However, as argued by Schwab and Cummings (1976) and by Lawler (1971, 1973), people's task and expectancy perceptions on a given objective task may be moderated by individual differences. This study primarily treated people's perceptions of expectancy and task characteristics as criterion variables to be associated with the nature of the task and personality dimensions. Specifically, this study explored the role of personality variables—extraversion and neuroticism—on perceptions of expectancy and of task characteristics in two different task conditions. Another issue investigated in this study dealt with the nature of interaction between task stimulation and extraversion on task satisfaction and performance.

The findings of this study provide empirical support for the arguments made by Schwab and Cummings (1976) and by Lawler (1971, 1973). It appears that individual differences influence people's perceptions on objective tasks. Further, the findings of this study on extraversion tended to be consistent with those of Smith (1955) and of Hill (1975) in that extraversion has little impact on people's perceptions in simple repetitive tasks which presumably offer a negligible task-based stimulation. Similarly, the findings on neuroticism also tended to be in consonance with those of

Smith (1955) and of Organ (1975). Differential perceptual responses between the extraverted and the introverted and between the low-neuroticism individuals and the high-neuroticism individuals tended to be prevalent for the tasks that provide a certain degree of task-based stimulation. Therefore, concurring with the arguments of Schwab and Cummings (1976), it would be useful to view perceptual reactions on task characteristics and expectancy perception as intervening between objective task and employees' affective and behavioral reactions. Clearly, more information is needed about the determinants of perceptions on task characteristics as well as expectancy, given an objective task.

With respect to task satisfaction, the findings support a proposition suggested by Hamner and Organ (1978) that the nature of the task stimulation may interact with the degree of extraversion in terms of task satisfaction. This observed interaction effect between task and extraversion on task satisfaction is not likely attributable solely to subjects' differential perceptions of motivating characteristics on two different tasks employed, as no interaction effect between task and extraversion on motivating potential score was observed.

In regard to performance, no support for the interaction hypothesis was found. The extent to which the ability of subjects in this study is relatively similar, due to homogeneity of age, experience, prerequisites, and so on, this finding suggests that the nature of task characteristics does not interact with the extraversion dimension of personality influencing motivation of subjects and generating subsequent performance differential. Thus, the proposition of Hamner and Organ (1978) was confirmed only for task satisfaction, not for performance. It might be possible that extraversion as related to task characteristics has a more prevalent effect on withdrawal behavior (Cooper & Payne, 1967) than on "producing" behavior in the task situation. However, the time allowed for the experimental task was not systematically varied in this study. It thus is not feasible to assess whether or not enough time was given to subjects to produce differential performance levels. In this regard, one can only speculate that affective responses (i.e., task satisfaction), as compared to behavioral responses, may require less amount of time before the influence of extraversion can be evoked by task stimulation.

If these findings are generalizable, several managerial implications can be noted. First there is potential danger in assuming that any changes in task characteristics by manipulating the objective task characteristics in an organization will automatically lead to the same perceptual reactions for all employees. The findings of this study imply that assumption to be valid only in nonstimulating jobs. However, if the managers attempt to *enrich* the job by changing the task characteristics, differential perceptions of task and of expectancy do occur among employees, depending on their personality. Therefore, managers can gain additional insights on the probability of success in job enrichment by recognizing the nature of personality among the employees under the enrichment program. More importantly, when the managers attempt to manipulate objective task contingencies to influence positively the employees' perceptions of task, they should routinely check for potential individual differences.

Second, in addition to perceptual differentials, personality moderates employees' affective and behavioral responses, given an objective task. One such personality factor appears to be the extraversion dimension of personality. Therefore, this finding suggests an important implication for personnel placement. For example, managers' assessments of employees' extraverted tendencies could yield a more appropriate match between employees and jobs with varying degree of motivating characteristics.

It should be noted that the validity of the findings on performance may be limited by the fact that the interrater reliability was a moderate .71. Thus, one might question the extent to which the ratings of in-basket exercises represent actual performance. However, even when an objective performance measure was used in the numerical exercise (i.e., the number of correct answers), the findings did not confirm the prediction. Therefore, the disconfirmation of the hypothesis on performance may not be due solely to the moderate reliability of performance measure.

It should be noted also that this study examined *whether* extraversion and neuroticism influence expectancy perception and perception of task characteristics, rather than specifically seeking to answer *why* such personality dimensions may influence such perceptions. Therefore, based on the results of this study, one can only speculate that people's perceptual responses may be the result of interaction between the nature of stimulus properties and the dispositional tendencies of the perceivers, such as extraversion and neuroticism.

Another limitation of this study stems from the nature of the subjects of the study. The use of college students poses a threat to the external validity of the findings. As noted earlier, the research issues of this study have not been investigated within the context of task design. Therefore, a logical direction of future research on these issues would be a replication in the field setting. Further, future research might systematically focus on causal propositions as well as directional tendencies of these personality dimensions on people's expectancy and task perceptions when they engage in enriched tasks within both a laboratory and a field setting.

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Attitudinal Congruence and Similarity as Related to Interpersonal Evaluations in Manager-Subordinate Dyads

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This field study examined the relationship of both actual similarity and perceptual congruence with job satisfaction and performance evaluation in 194 manager-subordinate dyads. Among other findings, congruence between the subordinate's description of the manager and the manager's self-description was significantly correlated with the subordinate's satisfaction. Congruence between the manager's description of the subordinate and subordinate's self-description was significantly related to the manager's evaluation of the subordinate's job performance.

In recent years applied researchers have become increasingly interested in the interpersonal relationships within manager-subordinate dyads. The majority of studies have focused on actual similarity between managers and their subordinates as related to managers' appraisals of subordinates' performance (Miles, 1964; Nieva, 1976; Ruda, 1970; Senger, 1971), subordinates' job satisfaction (Huber, 1970) and subordinates' evaluations of their managers (Weiss, 1977). A few studies have examined the extent to which subordinates congruently perceive their managers (referred to here as "subordinate's perceptual congruence"). These studies suggest that subordinates who are more perceptually aware of their superiors' work-related attitudes receive higher performance evaluations (Golmieh, 1974; Greene, 1972; Labovitz, 1972) and are more satisfied with their superiors (Howard, 1968).

Each of these previous studies has researched only a part of this complex dyadic interpersonal relationship. First, none of the studies has examined the effects of a manager's congruent perception of a subordinate's work-related attitudes (i.e., "manager's perceptual congruence"). Second, no studies can be found that directly compare the relative importance of actual similarity with that of perceptual congruence. Third, none of the previous studies has looked at interpersonal perception by the manager and by the subordinate simultaneously within the same dyad.

The purpose of the present field investigation was to study both actual similarity and perceptual congruence, and to examine them from the perspective of both the manager and the subordinate. The study investigated the relationships of these perceptual processes to two important organizational outcomes: subordinates' satisfaction with work and supervision, and managers' evaluations of subordinates' job performance. Specifically, the study examined: (a) the relative magnitude of perceptual congruence and actual similarity with these two organizational outcomes; (b) whether the more congruently a subordinate perceives the manager (subordinate's perceptual congruence), the more satisfied the subordinate will be; and (c) whether the more congruently a manager perceives the subordinate (manager's perceptual congruence), the higher the subordinate's performance will be evaluated.

METHOD

Subjects

Students from two large midwestern universities were asked to participate in the study only if they were currently employed and reported to an immediate manager. Data were collected from 194 students holding jobs in various organizations throughout northern Ohio. In addition, the immediate manager of each of these subjects participated in the research, resulting in 194 separate manager-subordinate dyads. All managers contacted agreed to participate.

The sample of subordinates included 104 males (54 percent) and 90 females (46 percent). Their ages ranged from 18 to 43 years with a mean age of 21.5 years. They spent an average of 27.8 hours per week at their jobs and had been employed for an average of 2 years. The subordinates were drawn from diverse organizational backgrounds including manufacturing, professional, and service organizations. The various job levels included such occupations as waiters/waitresses, salespersons, and engineers. The managerial sample consisted of 141 males (73 percent) and 53 females (27 percent). Their age breakdown was as follows: 18-29 ($N=60$); 30-39 ($N=54$); 40-49 ($N=41$); and 50-65 ($N=39$). These managers had, on the average, 6.4 years of supervisory experience and 22 subordinates reporting directly to them.

Independent Measures

Attitudes were measured by means of a semantic differential. This technique was chosen to tap perceptual processes and at the same time minimize the transparency of the measurement process. The seven concepts along which attitudes were assessed (i.e., responsibility, loyalty, goals and planning, social values, personality, belief in authority, and work) were chosen based on their potential impact on managerial and subordinate behaviors exhibited in the work environment.

For each of the seven concepts, four bipolar adjective scales were selected to represent each of the three dimensions of the semantic space: evaluancy, potency, and activity (Osgood, Suci, & Tannenbaum, 1957), resulting in 12 7-point bipolar adjective scales for each concept. An important consideration in the scale selection process was the relevance of the adjectives to the particular concept being judged. Further, in order to minimize response set tendencies, the scales were alternated in terms of polarity and the order of dimension representation was randomized within each of the concepts. The respondents were asked to check 1 of 7 rating positions for each of the 12 adjective pairs on each of the concepts. An example of the first part of one such semantic differential appears below exactly as presented to the subjects:

Personality

Kind _____:_____:_____:_____:_____:_____:_____: Cruel
Calm _____:_____:_____:_____:_____:_____:_____: Excitable
Good _____:_____:_____:_____:_____:_____:_____: Bad

Dependent Measures

Subordinate satisfaction was assessed by means of the 20-item Minnesota Satisfaction Questionnaires (MSQ)-Short Form (Weiss, Dawis, England, & Lofquist, 1967) and two scales of the Job Descriptive Index (JDI) (Smith, Kendall, & Hulin, 1969). The MSQ yielded three measures: Intrinsic (MSQI), extrinsic (MSQE), and general (MSQGS) satisfaction. MSQGS was determined by summing scores for all 20 items. MSQI and MSQE were obtained by summing certain subsets of items. Measures of satisfaction with work (JDIW) and satisfaction with supervision (JDIS) were taken from the JDI.

Managers evaluated the job performance of their subordinates by completing the Minnesota Satisfactoriness Scale (MSS) (Gibson, Weiss, Dawis, & Lofquist, 1970). The 28-item instrument contains five scales: performance (MSSP), conformance (MSSC), dependability (MSSD), personal adjustment (MSSPA) and general satisfactoriness (MSSGS). The MSSP scale concerns the subordinate's promotability and the quality and quantity of work. The MSSC scale reflects how well the subordinate gets along with the supervisor and co-workers as well as the observance of rules and regulations. The MSSD scale assesses the frequency of disciplinary problems created by the subordinate. The MSSPA scale concerns the subordinate's emotional health or well-being, and the MSSGS is an overall global measure of performance across all 28 items. For each item, the manager is asked to check a 3-point scale. The possible ranges of scores for the five scales are as follows: MSSP (9-27), MSSC (7-21), MSSD (4-12), MSSPA (7-21), and MSSGS (28-84).

Procedure

Students were asked to complete two semantic differentials during class. They were told that the purpose of the semantic differentials was to measure the meaning of things to people by having them judge certain concepts against a series of descriptive scales. On the first semantic differential, the respondents were instructed to describe themselves by checking 1 of the 7 rating positions for each of the 12 bipolar adjective pairs associated with each of the 7 concepts. They then were told to use the second semantic differential to describe their immediate manager. The respondents were instructed to mark the scales *not* as they thought their manager would, but simply to describe this individual. They also completed the MSQ and JDI and provided information regarding their number of hours worked per week as well as the length of time they had worked for their present manager. They were assured that all data collected would be held in strict confidence. In addition, each respondent was asked to provide the name of his/her manager and was informed that this individual would be contacted. Subsequently, each manager was contacted, with an explanation of the purpose of the study, and asked to participate. Two semantic differentials, the same as those completed by the subordinates, then were sent to each manager: one in which the subordinate was described and the other in which the manager described himself. The managers also completed the MSS and were asked to provide information regarding years of supervisory experience and number of subordinates reporting directly to them.

RESULTS

Both the dependent and independent measures were assessed for internal consistency reliability. The coefficient alphas for the semantic differentials ranged from .93 to .99, for the satisfaction measures from .83 to .95, and for the performance evaluations from .64 to .91.

The four semantic differentials (subordinate self-description, subordinate description of the manager, manager self-description, and manager description of the subordinate) were used to provide operational measures of attitudinal congruence and similarity. The discrepancy between two semantic differentials was measured by using the generalized euclidean distance measure, *D* (Cronbach & Gleser, 1953). This *D* index is a function of absolute difference scores. It was computed to obtain the following three measures:

1. Subordinate's perceptual congruence: the difference between a subordinate's description of the manager and the manager's self-description.
2. Manager's perceptual congruence: the difference between the manager's description of the subordinate and the subordinate's self-description.
3. Actual similarity: the difference between a subordinate's self-description and the manager's self-description.

Each of these measures was calculated for each of the seven concepts as well as at an overall level for the seven concepts combined. Lower *D* scores indicate greater congruence or more similarity.

In order to assess the relative independence of the seven concepts, an intercorrelation matrix was computed for each of the congruence and similarity measures. The median intercorrelations for subordinate's perceptual congruence, manager's perceptual congruence, and actual similarity were .14, .12, and .10, respectively. Their ranges were .03 to .26, .01 to .36, and −.04 to .17. These results indicate that the concepts were relatively independent.

Intercorrelations also were computed among the various components of perceptual congruence and actual similarity. These analyses showed that these components also were relatively independent. The subordinates' self-description correlated .06 with their descriptions of their own managers, .12 with their managers' self-descriptions, and .13 with their managers' descriptions of them. The managers' self-descriptions correlated .11 with their subordinates' descriptions of them, and .39 with the managers' descriptions of their subordinates. The managers' descriptions of their subordinates and their subordinates' descriptions of them correlated .17.

The interrelationships among the three congruence and similarity measures also were examined. The intercorrelations were .34 (subordinate's vs. manager's perceptual congruence), .38 (subordinate's perceptual congruence vs. actual similarity) and .20 (manager's perceptual congruence vs. actual similarity), suggesting that the perceptual processes of congruence and similarity also were relatively unrelated.

The correlations among the measures of satisfaction and performance are presented in Table 1. The satisfaction measures are significantly interrelated (upper left triangle) as are the performance measures (lower right triangle). This indicates a respectable degree of convergent validity of the individual subscales for both the satisfaction and the performance measures. However, these correlations are not so high as to make the individual scales redundant. Although 11 of the 25 correlations between satisfaction and performance measures were statistically significant (upper right rectangle), proportions of variance accounted for were substantially lower than for any of the correlations in either triangle.

The relationships between subordinate's perceptual congruence and satisfaction are presented in Table 2. It can be seen that there is a strong consistent relationship between subordinate's perceptual congruence and the

TABLE 1
Intercorrelations Among Satisfaction and Performance Variables
($N = 194$)

	Satisfaction					*Performance*				
	Work	*Supervision*	*Intrinsic*	*Extrinsic*	*General*	*Performance*	*Conformance*	*Dependability*	*Personal Adjustment*	*General Satisfactoriness*
Work		.57**	.65**	.56**	.66**	.01	−.03	.00	.06	.01
Supervision			.49**	.73**	.63**	.21**	.21**	.20**	.20**	.25**
Intrinsic				.63**	.93**	.05	.03	.01	.08	.05
Extrinsic					.85**	.16*	.16*	.18**	.20**	.21**
General						.09	.08	.08	.14*	.11
Performance							.59**	.56**	.47**	.85**
Conformance								.66**	.54**	.84**
Dependability									.64**	.80**
Personal adjustment										.78**
General satisfactoriness										

*$p < .05$ (two-tailed)
**$p < .01$ (two-tailed)

TABLE 2
Correlations Between Subordinate's Perceptual Congruence and Satisfaction[a]
($N = 194$)

Perceptual Congruence	Satisfaction Measures				
	Work	*Supervision*	*Intrinsic*	*Extrinsic*	*General*
Responsibility	.19**	.42**	.13*	.38**	.25**
Loyalty	.05	.17**	.09	.10	.10
Goals/planning	.13*	.20**	.11	.16*	.14*
Social values	.19**	.29**	.23**	.32**	.28**
Personality	.22**	.27**	.18**	.20**	.22**
Belief in authority	.23**	.17*	.16*	.22**	.20**
Work	.17**	.20**	.14*	.14*	.15*
Overall	.34**	.50**	.28**	.41**	.36**

[a] The signs of the correlations have been reversed so that they represent the relationship between subordinates' perceptual congruence and subordinates' satisfaction..

*$p < .05$ (two-tailed)

**$p < .01$ (two-tailed)

measures of satisfaction. Further, the correlations are consistently higher at the overall level than for any of the seven concepts individually. Additional analyses revealed that the subordinate's perceptual congruence correlated significantly higher with satisfaction with supervision than satisfaction with work ($t(191) = 5.91$, $p < .01$) and significantly higher with extrinsic than with intrinsic satisfaction ($t(191) = 3.58$, $p < .01$). All concepts, with the exception of loyalty, were consistently significantly related.

TABLE 3
Correlations Between Manager's Perceptual Congruence and Performance[a]
($N = 194$)

Perceptual Congruence	Performance Measures				
	Performance	*Conformance*	*Dependability*	*Personal Adjustment*	*General Satisfactoriness*
Responsibility	.26**	.21**	.14*	.21**	.26**
Loyalty	.23**	.26**	.22**	.19**	.27**
Goals/planning	.04	.04	.06	.02	.05
Social values	.12	.15*	.13*	.19**	.17*
Personality	.04	.03	.00	.10	.04
Belief in authority	.12	.08	.15*	.11	.13*
Work	.07	.02	.09	.04	.06
Overall	.24**	.21**	.19**	.23**	.27**

[a] The signs of the correlations have been reversed so that they represent the relationship between managers' perceptual congruence and subordinates' performance.

*$p < .05$ (two-tailed)

**$p < .01$ (two-tailed)

Table 3 shows the correlations between manager's perceptual congruence and the performance measures. It can be seen that the correlations were strongest for the concepts of responsibility and loyalty.

The correlations of actual similarity with performance were generally nonsignificant with the exception of low significant values for the concept of social values (MSSP = –.13, $p<.05$; MSSC = –.20, $p<.01$; MSSD = –.18, $p<.01$; MSSGS = –.17, $p<.05$). Similarly, correlations of actual similarity with satisfaction were nonsignificant except for the concept of responsibility (MSQE = –.19, $p<.01$; MSQGS = –.13, $p<.05$; JDIS = –.19, $p<.05$) and the concept of belief in authority (MSQE = –.16, $p<.05$; JDIS = –.13, $p<.05$).

The components of the perceptual congruence measures were examined for their individual contributions to the relationships in Tables 2 and 3. For subordinate's perceptual congruence, the subordinates' descriptions of their managers were significantly related to all the satisfaction scales (r's = .34 to .55, $p<.01$). None of the correlations between the managers' self-descriptions and subordinate satisfaction was statistically significant. When the components of manager's perceptual congruence were analyzed, the subordinate's self-descriptions were found to be significantly related to only one performance scale (personal adjustment, $r=.12$, $p<.05$). All the performance scales exhibited positive relationships to the managers' descriptions of their subordinates (r's = .47 to .62, $p<.01$).

To explore these results further, a first-order partial correlation procedure recommended by Wall and Payne (1973) and Weiss (1977) was used. Correlations were calculated partialling out each of the two component measures of subordinates' perceptual congruence. The results showed that after partialling out managers' self-descriptions all correlations remained within ±.01 of the zero-order correlations found in Table 3. Partialling subordinates' descriptions of their managers reduced the correlations by .12 to .17. Nevertheless, all these partials were still significant (JDIW = .20, $p<.01$; JDIS = .35, $p<.001$; MSQI = .16, $p<.05$; MSQE = .24, $p<.001$; MSQGS = .21, $p<.01$), indicating that subordinate's perceptual congruence does correlate significantly with job satisfaction independently of the subordinates' descriptions of their managers.

Similar analyses were conducted for managers' perceptual congruence on the two strongest concepts of responsibility and loyalty. As for responsibility, the findings showed that partialling out subordinates' self-descriptions had virtually no effect on the zero-order correlations shown in Table 3. However, the partial correlations controlling for managers' descriptions of subordinates were found to be nonsignificant. This indicated that managers' descriptions of their subordinates were the major contributing factor to the relationship between managers' perceptual congruence for responsibility and performance evaluations. As for the concept of loyalty, all partial correlations were found to be within ±.01 of the zero-order correlations. This indicated that managers' perceptual congruence for loyalty is essentially independent of the two congruence measure components.

Second-order partial correlations also were calculated by simultaneously partialling out both components of each perceptual congruence measure and thus correlating the residual scores after controlling for the effects of both variables (Winer, 1971). At the overall level the correlations between subordinate's perceptual congruence and satisfaction were reduced. All these correlations, however, remained significant (JDIW = –.19, $p < .01$; JDIS = –.34, $p < .01$; MSQE = –.24, $p < .01$; MSQI = –.15, $p < .05$; MSQGS = –.20, $p < .01$). For manager's perceptual congruence, the second-order partials for the concept of loyalty remained within ±.01 of the zero-order correlations and were all significant. The second-order partials for the concept of responsibility were nonsignificant. These results confirm the findings of the first-order partial correlations.

DISCUSSION

The present field study found that the more cognizant a manager was of a subordinate's work-related attitudes, the more positively the subordinate was evaluated by that manager. Similarly, it was shown that the more congruently a subordinate perceived the manager's attitudes, the more satisfied the subordinate was with supervision received from the manager. A likely explanation for these results is that the congruent perception of another's attitudes is a rewarding experience. Seeing others as they see themselves allows one to understand better their actions and to predict their future behaviors. This perceptual congruence is particularly important in manager-subordinate dyads within formal organizations because managers and subordinates serve as important sources of motive attainment for one another (Katz & Stotland, 1959; Lowin & Craig, 1968). The state of mutual congruence can be considered to be a form of accurate communication that is associated with feelings of interpersonal satisfaction (Newcomb, 1956). This perceptual congruence is likely brought about in much the same way that Kahn's Role Episode Model (Katz & Kahn, 1978) links the behavioral expectations of one person to the exhibited behaviors of another. Through a process of role sending, one person communicates to another certain verbal and nonverbal cues regarding his or her work-related attitudes. The accuracy with which these attitudes are perceived is a function of both the sensitivity of the receiver and the consistency and openness of the sender, all of which contribute to interpersonal satisfaction. The importance of the perceptual nature of this process is attested to by the relatively weak relationships of actual similarity as predictors of satisfaction and performance evaluation. These results suggest that in work settings, actual attitude similarity may not be as important to the process of manager-subordinate interpersonal relations as is the congruent perception of the other person's work-related attitudes.

The generalizability of these results remains to be demonstrated in other studies. These findings are the result of a field study using a wide variety of organizational settings and job types; thus the likelihood of replication in other organizations seems high. It is important that future research expand the findings across organizations, job levels, and types of workers. It should be noted that it was not the intent of the present research to examine the causal relationships among the variables of interest. The correlational nature of these data precludes inferences about the directionality of influence in these complex interpersonal processes.

In addition to examining the causal linkages in this dyad, continued research should be conducted along several lines. First, for a more complete understanding of the phenomenon of perceptual congruence, moderating effects of such variables as subordinate self-esteem, manager span of control, and managerial style should be investigated. Second, the semantic differential used in the present study assumed that the seven work-related concepts were valued by all managers and subordinates. It is reasonable to postulate that differences might exist in the importance of these concepts for different people. In fact, there could be other concepts of equal or greater importance that were not included in this research. It would seem logical that subsequent research might follow a more idiographic approach by investigating the valued concepts within each of the manager-subordinate dyads.

This study represents an additional link in the exploration of the individual's perception of the workplace. Previous research has focused primarily on two aspects of the person's interactions with the work environment: namely, the worker-organization fit and the worker-job fit. Newman (1975), for example, studied the congruence between objective and perceived organizational characteristics and found this congruence to be related to a worker's job involvement and satisfaction. Other researchers have examined the congruence between a worker's described and preferred job characteristics, and its relationship to worker satisfaction and performance (Sterns, Alexander, Barrett, & Dambrot, 1977) as well as mental and physical health (Coburn, 1975). The present study has focused on another aspect of the worker's perceptual congruence, that is, person-person congruence. Future experimental work is needed to begin examining the relative contributions of these three types of perceptual congruence (i.e., worker-organization, worker-job, person-person) to employee satisfaction and performance.

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A Role and Expectancy Perception Model of Participation in Decision Making[1]

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Based on some suggestions in the literature, a model was developed to illustrate the "how" of participation in decision making. The model depicts role and expectancy perceptions in explaining how participation mediates the relationship between participation in decision making and employee attitudes. It therefore may offer a parsimonious framework in which to explain the influence of several organizational and individual conditions on the participation process.

In an incisive critique of the literature and research on the effectiveness of participation in decision making, Locke and Schweiger (1979) suggest that there are two major conditions under which variations in the effectiveness of participation may be and have been found, i.e., *when* participation works. They identified the two major conditions as *individual* and *organizational*. Within each of these they identified several subconditions, e.g., at the individual level, task knowledge (Strauss & Rosenstein, 1970, Vroom, 1959) and motivation (Vroom & Mann, 1960; Tosi, 1970; Carroll & Tosi, 1973; Ivancevich, 1976); and at the organizational level, task characteristics (Morse & Lorsch, 1970), group characteristics (Wood, 1973; Mansbridge, 1973; Sashkin, 1976) and leader characteristics (Maslow, 1970; Scheflen, Lawler, & Hackman, 1971; Maier, 1970; Vroom & Yetton, 1973). Although these individual and organizational conditions are hypothesized to moderate the participation-attitude and behavior relationships, there is some disagreement as to the nature of the moderating effect (Melcher, 1976; Morse & Lorsch, 1970; Argyle, Gardner, & Cioffi,

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1958). For example, participation may be hypothesized to be positively related to satisfaction and performance under routine task conditions (Melcher, 1976) or hypothesized to be positively related to satisfaction and performance under nonroutine task conditions (Morse & Lorsch, 1970) or even hypothesized to be negatively related to satisfaction and performance under routine task conditions (Mitchell, 1973). The results of the participation research, however, generally suggest that regardless of the nature of the moderating condition, the participation-attitude and behavior relationships are positive (Vroom, 1964). Thus the answer to the question as to *when* participation works appears to be more well researched and the results more consistent than does the answer to the question as to *how* participation works. The focus of this study, therefore, is to present and test a model of *how* participation in decision making works.

It is argued here that a fruitful focus for understanding how participation works is a role and expectancy perception approach to participation in decision making suggested in part by Schuler (1977a), Mitchell (1973), Morris, Steers, and Koch (1979), and Schuler, Aldag and Brief (1977). First, Mitchell argued that under a participative system employee perceptions of the effort-performance relationship (Expectancy 1) become clearer. In addition, Mitchell stated that "through participation, the individual should know fairly well which behaviors are likely to be rewarded and which are not" (Expectancy 2) (1973, p. 674). Therefore, according to Mitchell, it is not "participation" per se that increases satisfaction and performance, but rather improvement of employee's expectancies—effort-performance (Expectancy 1) and performance-reward (Expectancy 2)—that influences employee motivation, performance, and satisfaction. Mitchell's rationale regarding Expectancy 2 was moderately supported by Schuler and Kim (1978).

Schuler's (1977a) results, although not examining the intervening effects of role perceptions, suggest that participation is also related to employee role perceptions of conflict and ambiguity: the more the participation in decision making, the lower the levels of role conflict and ambiguity. Morris et al. (1979) reported in fact that participation in decision making was the most salient predictor of role conflict and the second most salient predictor of role ambiguity for samples of secretarial/clerical employees, blue collar employees, and professional employees. In addition, it is generally found that the lower the perceived levels of role conflict and ambiguity, the higher the levels of performance and satisfaction (Schuler et al., 1977).

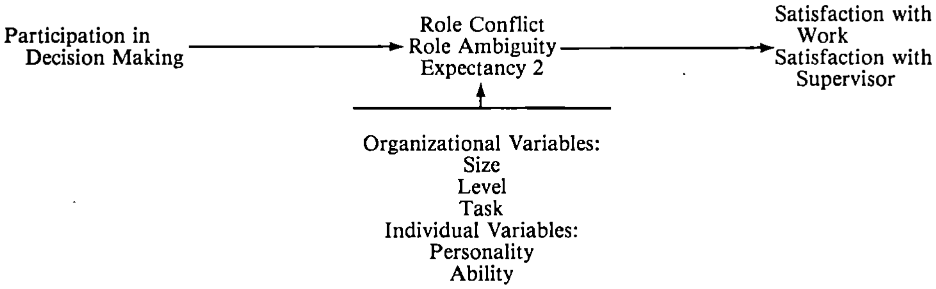
Role and expectancy perceptions, therefore, appear to have reasonable empirical and theoretical relationships with participation in decision making and satisfaction and performance.

Thus Schuler's (1977a), Mitchell's (1973), and Morris et al.'s (1979) findings suggest not only that expectancy and role perceptions may explain the process by which (how) participation in decision making works, but they implicitly suggest a model in which expectancy and role perceptions are intervening variables between participation and satisfaction and performance.

Adding to the complexity and richness of this role and expectancy perception model of participation in decision making are the results from previous research indicating that role and expectancy perceptions may in part be influenced by several organizational and individual conditions. Such conditions would include organizational structure, task design, employee ability and personality, spans of subordination, formalization, and supervisory span (House & Rizzo, 1972; Schwab & Cummings, 1976; Van Sell, Brief, & Schuler, 1978; Schuler, 1977b, 1977c; Morris et al., 1979). Those results thus not only add richness to the model but also suggest that the model may be a parsimonious way to summarize the effects of several organizational and individual conditions (See Figure 1).

FIGURE 1

Hypothesized Relationships of Individual and Organizational Variables and Role and Expectancy Perceptions and Satisfaction and the Appropriateness of Participation in Decision Making



Thus, based on the above review, a role and expectancy perception model of participation in decision making is suggested as a way to a better understanding of when and how participation in decision making works. This study and test of the model is limited because it deals only with the participation in decision making-satisfaction relationship. Performance and the effort-performance expectancy are not investigated here. Furthermore, participation is restricted to decisions regarding issues influencing the employee directly and not those decisions dealing with larger plant or organizational issues (Strauss, 1963; Obradovic, 1970; Lischeron & Wall, 1974). It should be noted, however, that most of the participation research is of the type dealing with issues or decisions directly affecting the employee (Locke & Schweiger, 1979).

Based on Mitchell's (1973) rationale and the findings of Schuler and Kim (1978) it is hypothesized here that participation in decision making is related to employee perceptions of the performance-reward expectancy because it allows, among other things, a chance for the employee to verify the actual performance contingencies in the organization with his/her supervisor and fellow employees. Furthermore, it is hypothesized, based on the findings reported by Schuler (1977a), that participation is related to employee perceptions of role conflict and ambiguity. The more participation that an employee has with his/her supervisor and fellow workers, the more chances there are for role clarification and even role conflict awareness and resolution. For example, if an employee is in role conflict due to a shortage of material required for his/her job, participation between the employee and supervisor should highlight this conflict and increase its chance of resolution. Implicit in these two general hypotheses is that the *content* of the participation is related to role and expectancy perceptions, thus facilitating the *process* of participation hypothesized to be related to Expectancy 2 and role conflict and ambiguity.

In addition, this study explores only one possible model of participation in decision making. Although a substantial portion of the variance in the participation in decision making-satisfaction relationship should be explained by this model, other explanations such as the effect of social influence on behavior, the valence of outcomes, and self-control (Mitchell, 1973) may still explain some of the remaining variance.

The specific hypotheses to be examined here are:

1. There will be a negative relationship between participation in decision making and role conflict and ambiguity and a positive relationship between participation in decision making and the performance–reward expectancy.

2. There will be a positive association between participation in decision making and satisfaction with supervisor and satisfaction with work.

3. The positive association between participation in decision making and satisfaction will be attenuated upon removing role conflict and ambiguity and the Expectancy 2 perceptions.

To make these results more suggestive, two distinctly different samples were used. Sample A is a plant of a large manufacturing organization and sample B is an office of a large public utility. Although use of two different samples may also facilitate generalizability, it should be noted that both samples are from large organizations and represent only a very select portion of the types of organizations that exist.

METHOD

Sample A

Questionnaires were administered to 382 employees of a large manufacturing firm. The sample was divided into three organization levels: higher level: upper level managers and professional employees; middle level: middle level managers and entry level professionals; lower level: clerical workers, tradesmen, technicians, and lower skilled blue-collar maintenance men. There were 106 employees at the lower level of the organization, 180 at the middle, and 96 at a higher level of the organization. The characteristics of the employees in each of the three levels were as follows:

higher level: average age 52 years, 85 males, 11 females, and average tenure of 16 years; middle level: average age 46 years, 112 males, 68 females, and average tenure of 14 years; lower level: average age 36 years, 56 males, 50 females, and average tenure of 8 years. The questionnaire was administered on company time to employees who volunteered to participate. The firm is engaged in the research and development of glass products and experiences relatively rapid changes in methods and technology.

Sample B

Questionnaires were administered to 429 employees in a large public utility firm. There were three organizational levels represented in the sample. The first level was composed of secretaries, staff employees, and clerical employees. The second level had only first level supervisors, those supervisors of the first level employees. The third level represented second and third level supervisors of the first level supervisors. The characteristics of the sample for each level were as follows: first level: average age 33 years, 30 males, 66 females, and average tenure of 7 years; second level: average age of 46 years, 180 males, 29 females, and average tenure of 18 years; third level: average age 53 years, 95 males, 15 females, and average tenure of 25 years.

The respondents completed a questionnaire administered to them at the company location on company time. All respondents were assured complete confidentiality. The process of completing the questionnaires required about one hour. The organization is engaged in the development and technological advancement of electronic equipment. The organization is frequently faced with technological advancements and new equipment to service its customers.

Measures

Role conflict and ambiguity were 8- and 6-item scales, respectively (Rizzo, House & Lirtzman, 1970). Estimated internal reliabilities (Cronbach alpha) are .72 and .78 for role conflict and .80 and .85 for role ambiguity in samples A and B respectively. A more complete psychometric evaluation of these scales is found in Schuler et al. (1977). Role conflict and ambiguity were scored so that the greater the score, the *more* the role conflict and ambiguity.

The expectancy items measuring the performance-reward relationship (E2) were originally developed by House and Dessler (1974). They were adapted for use in this study. Twelve items formed the E2 measure, and its internal reliability was .87 and .84 for samples A and B, respectively.

Satisfaction with work and supervisor were measured by the Job Descriptive Index (JDI) (Smith, Kendall, & Hulin, 1969).

Participation in decision making was measured by five items taken from Siegel and Ruh (1973). A sample of the five items they adapted from

Lodhal and Kejner include: (a) To what extent are you able to decide how to do your job? (b) In general, how much say or influence do you have on your job? The internal reliabilities for samples A and B were .87 and .85, respectively.

The correlations among the variables in each sample are shown in Table 1. It should be noted that the scoring format for the role and expectancy perceptions and participation was a 5-point Likert scale ranging from "definitely not true" to "extremely true" of my job or job situation. Satisfaction with work and satisfaction with supervisor were scored using the standard procedures of the JDI (Smith et al., 1969), i.e., "1" for yes, "2" for no, and "3" for undecided and then recoding appropriately for positive and negative items. The validity of the role conflict and ambiguity is described in detail by Schuler et al. (1977) and the validity of the JDI is provided by Robinson, Athanasiou, and Head (1969). Although the validities of the scales and the varying response formats help reduce the possibility of method variance and halo errors, they do not insure that these errors are nonexistent or even minimal. Correlations of additional variables with similar formats but theoretically unrelated to the variables in the study, however, can shed information on the extent or magnitude of the method variance and halo errors. Therefore, the relationships were determined between participation in decision making and satisfaction with pay and satisfaction with promotion (both measured by the JDI) and between role conflict and task skill variety as measured by the Job Diagnostic Survey (Hackman & Oldham, 1975) for sample B and a similar scale for sample A.

For sample A, the zero order correlations between participation in decision making and satisfaction with pay and with promotion were .14 ($p<.05$) and .09 (n.s.), respectively. This same pair of correlations for sample B was .16 ($p<.05$) and .11 ($p<.05$). Although the relationships were small, they were significant because of the large sample sizes. In contrast, the relationships between role conflict and task skill variety (both scales having 5-point Likert scoring formats) were small but nonsignificant. These relationships were .09 and .03 for samples A and B, respectively.

Thus, with the scale validities, varying scale response formats, and minimal correlations among scales with similar and different scoring formats

TABLE 1
Zero Order Correlations Among the Role and Expectancy Perceptions and Satisfaction

	1	*2*	*3*	*4*
1. Role conflict				
2. Role ambiguity	.35**(.34**)[a]			
3. Expectancy 2	-.14* (-.14*)	-.41**(-.28**)		
4. Satisfaction with work	-.36**(-.20**)	-.47**(-.41**)	.38**(.36)	
5. Satisfaction with supervisor	-.33**(-.31**)	-.39**(-.43**)	.39**(.36**)	.25**(.34**)

[a] Correlations in parentheses are for sample B and those without parentheses are for sample A.

*$p<.05$

**$p<.01$

and no theoretical relationships, the possibility of method variance and halo errors determining the results appears minimal.

Analysis

To test the first hypothesis, zero order correlations were computed between participation in decision making and role conflict, role ambiguity, and the performance-reward relationship (E2). The second hypothesis was examined by computing zero order correlations between participation in decision making and satisfaction with work and satisfaction with supervisor. The third hypothesis was tested by computing partial correlations between participation in decision making and satisfaction with work and satisfaction with supervisor.

RESULTS

The data for the three hypotheses are shown in Table 2. The relationships indicate strong support for the hypotheses in both samples. In Hypothesis 1 it was predicted that participation in decision making would be negatively related to role conflict and ambiguity and positively related to the performance-reward relationship. For sample A these relationships were $-.41$ ($p < .01$), $-.47$ ($p < .01$) and $.46$ ($p < .01$), respectively and for sample B these relationships were $-.37$ ($p < .01$), $-.49$ ($p < .01$) and $.42$ ($p < .01$), respectively.

The relationships between participation in decision making and satisfaction with work and with supervisor were predicted to be positive, and the third hypothesis predicted those relationships would be attenuated by removing role perceptions and expectancy perceptions. The correlations shown in Table 2 indicate strong support for these hypotheses. In sample

TABLE 2
Relationships Between Participation in Decision Making and Expectancy Perceptions and Satisfaction with Work and Supervisor Attenuated by the Role and Expectancy Perceptions

	Role Conflict	*Role Ambiguity*	*Expectancy 2*	*Satisfaction with Work*	*Satisfaction with Supervisor*
Sample A					
Participation in decision making	−.41	−.47	.46	.51[a]/.14[b,c]	.56[a]/.15[b]
Sample B					
Participation in decision making	−.37	−.49	.42	.46[a]/.13[b]	.45[a]/.03[b]

[a] Zero-order correlations.

[b] Partial correlations removing role conflict, role ambiguity, and expectancy 2.

[c] Differences between the zero-order and partial order correlations were determined by Fisher *r* to *z* transformations.

A, the zero order correlations between participation in decision making and satisfaction with work and with supervisor were .51 ($p < .05$) and .56 ($p < .05$), and those correlations removing role conflict, role ambiguity, and expectancy 2 were .14 ($p < .05$) and .15 ($p < .05$), respectively. Both of these respective pairs of correlations were significantly different ($p < .01$). In sample B the pattern and magnitude of results were duplicated. The respective pairs of correlations also were significantly different as the correlations between participation in decision making and satisfaction with work were .46 ($p < .01$) and .13 ($p < .05$) for the zero order correlation and the partial order correlation removing role conflict, role ambiguity, and expectancy 2. These respective correlations for satisfaction with supervisor were .45 ($p < .01$) and .03 (n.s.).

DISCUSSION

The results strongly support the hypothesized relationships between participation in decision making and the role and expectancy perceptions and between participation in decision making and satisfaction with work and with supervisor attenuated by role and expectancy perceptions in two samples. Thus this model of perceptions suggests an understanding of *how* participation in decision making works.

The role and expectancy perception model, however, may not only provide a reasonable theoretical perspective for understanding the participation in decision making-satisfaction and performance relationships, but also suggest a means by which to interpret the influence of the various organizational and individual variables associated with role and expectancy perceptions. For example, Argyle et al.'s (1958) finding that participation was effective only in departments not under incentive pay can be explained in the role and expectancy perception framework by describing participation as being effective because it helped in this situation to clarify expectancies which may not have been clear due to the lack of an incentive pay system. The performance-pay relationship in the incentive pay department perhaps was sufficiently clear to preclude any clarifying role for participation. The results reported here also suggest that analyzing employee role and expectancy perceptions may be a parsimonious and efficient way to determine the appropriateness of participation in decision making.

Although performance was not used in this study, similar relationships between participation in decision making and performance would be hypothesized as was done between participation in decision making and satisfaction. This is because of the strong association of participation in decision making with role and expectancy perceptions and the strong association frequently found between role perceptions and employee satisfaction *and* performance (Van Sell et al., 1978). It is probable, however, that the expectancy perception used in this study may be more effective in the participation–performance model than in the participation-satisfaction model examined here. This is because the performance-outcome expectancy may be more appropriate for the participation-performance model and a job-outcome expectancy may be more appropriate for the participation–satisfaction model. Indeed, future research using the role and expectancy perceptions in the participation-satisfaction model may consider expectancy measures of the more general job-outcome relationships as opposed to only the job performance-outcome relationships.

Again, it must be emphasized that only one model of participation was presented here and only one set of rationale for the effectiveness of participation. This model of role and expectancy perceptions of participation in decision making, however, may be extremely useful in guiding future research and application of participation in decision making. Further research remains on the nature of the model, such as the determinants of role perceptions and the performance-reward relationships. Although the results from two samples supported the hypotheses, the data were collected by the same method and cross-sectionally. Therefore, future research should be done on the model with independent measures of some of the variables and a longitudinal or experimental format to detect causality among the variables.

CONCLUSION

A role and expectancy perception model of participation in decision making was developed here in an attempt to obtain a better understanding of the *how* of participation. The model and the results here suggest that previous studies on participation may have found participation more or less effective because of the levels of role and expectancy perceptions of the employees. Future research could test the model presented here and add to its ability to interpret past results by examining several of the previously used organizational and/or individual conditions with the associated levels of role and expectancy perceptions in a longitudinal and/or experimental design.

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Research Notes

ORGANIZATIONAL SIZE, TECHNOLOGY, AND STRUCTURE: REPLICATION OF A STUDY OF SOCIAL SERVICE AGENCIES AMONG SMALL RETAIL FIRMS[1]

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The purpose of this paper is to report a study of small retail firms which analytically replicated Dewar and Hage's (1978) study of social service agencies in which the major variables were organizational size, technology, and structure. The relative importance of size and technology as determinants of organizational structure has been a major question for organizational researchers of the last decade. The work by Woodward (1965) established the tradition of examining technological determinants, and Hickson, Pugh, and Pheysey (1969) stimulated research that used size as a major predictor. A complicating factor in both of these research approaches is that two very different empirical referents for "structure" have been used. One of these has been the focus on complexity or occupational specialization. The other has been a focus on differentiation or functional division. Research and theory concerning these fundamental concepts of size, technology, complexity, and differentiation have been extensively reviewed, recently by Hall (1977) in textbook form and by Kmetz (1978) in more parsimonious article form. The work by Dewar and Hage (1978), however, is one of the first attempts at explicitly analyzing, from the same data base, the relationships among all four of these concepts and thus represents a major contribution to the organizational literature. Specifically, Dewar and Hage (1978) analyzed 3 waves—1964, 1967, and 1970—of data on each of 16 social service organizations and tested 12 bivariate propositions via regression and correlation analysis. The propositions were expressed in both cross-sectional (levels) terms and longitudinal (rates) terms and involved technology (task scope) and size as independent variables with complexity, horizontal differentiation, and vertical differentiation as dependent variables.

In addition to the empirically integrative contribution of their research, the Dewar and Hage work advances the field of organizational studies conceptually. Further understanding of organizations is achieved by their (1) making clear and useful conceptual distinctions and (2) providing detailed explanations for relationships among the distinctive concepts in

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[1] The author wishes to thank David Whetten, University of Illinois, and Robert Dewar, Northwestern University, for helpful material and comments on an earlier version of this paper.

(3) both longitudinal and cross-sectional versions. Space does not allow for an exhaustive listing of such contributions, but an example of one of the more important of these is their decomposition of the various aspects of the concept of specialization and their discussion of the relationship of organizational size to these aspects. The idea of specialization is distinguished from, among other concepts, task scope (a technology indicator), vertical differentiation (number of supervisory levels), and horizontal differentiation (number of departments or divisions) and is discussed as three types: (1) task specialization (number of job titles in unskilled occupations found in production organizations); (2) person specialization (number of job titles in professional occupations found in administrative organizations); (3) occupational specialization (number of types of knowledge of "complexity"). Dewar and Hage argue that organizational size, at most, has a weak relationship to this third type of specialization and that relationships of size with the first two types of specialization depend on the type of organization. They describe these relationships as follows:

> Why does size not have an impact on complexity, that is, the number of different occupational specialties? As size increases, there is no inherent reason why different specialties should be added except in administration. They are added in administration because the greater number of interactions generated by increased size complicates the task of administration and because economies of scale, consequent to increased size, make possible the hiring of additional specialties in this area. New occupational specialties in production would be added only if the technology becomes more complex, and increased size does not produce this effect; the major effect of increased size is on task and not on person specialization. When more personnel are added, if the work is routine, it can be easily broken down into more simple tasks, each of which can be given a job title. Indeed these titles are frequently created by the administrative specialists and arise because of the administrative need to classify the increasing numbers of personnel (Blau, 1970). By definition, however, person specialization is not similarly decomposable whether or not there are many additional personnel. There is a combination of activities or tasks that must be kept together and performed by one specialized person. Consequently we argue that in production technologies, as opposed to administrative or management ones, increasing size does not result in more occupational specialties either because more specialties are simply added or because existing specialized tasks can be decomposed into additional specialized parts (Dewar & Hage, 1978, pp. 113-114).

This discussion is the central part of their more extensive rationale for the 2 hypotheses concerning the cross-sectional and longitudinal relationship between size and complexity; similar types of discussions are provided for the other 10 hypotheses. The article, then, does provide additional explanatory depth, as well as empirical integration, in an area which has been a central concern for organizational researchers of the last decade. One shortcoming of the Dewar and Hage analysis, however, was that the organizations of the sample were all in the same sector, *public human services*, thus restricting generalizations to that type of organization.

The purpose of the present paper is to report a partial replication of the Dewar and Hage (1978) study among *private retail sales* organizations, thus allowing for wider generalizations and further specification of the relationships among the four variables. That is, the critical question to be answered is: Does the relative importance of size and technology in predicting structural complexity and differentiation remain constant across organizations distinguished by a fundamental difference in goals? The justification for the question is twofold: (1) it adds to the academically significant empirical and conceptual contributions of the Dewar and Hage (1978) study as described above; (2) it adds to the applicability of organizational theory because of its generalizability. Regarding this second point, it can be documented that much of current knowledge about organizational behavior comes from studies conducted within specific organizational populations in terms of goal similarity. Although this has facilitated methodological control, it has severely restricted the certainty of application beyond specific organizational types. The stark contrast in goals of the Dewar and Hage sample with the present sample—public service versus private profit—should provide a clear, although tentative due to sampling procedure, answer to the question of the general applicability of those theories that involve size and/or technology as principal explanatory variables. Although it is beyond the scope of this paper, such application would indeed be an advancement of the field; i.e., the ability to make a structural outcome prediction of a given change in size or technology that would hold for the public agency administrator as well as the small business manager.

The present study adopted Dewar and Hage's (1978) conceptual logic, and this paper reports the partially replicative analysis, pointing out and offering alternative reasons for similarities and differences in the findings. The analysis is partially replicative because the data are not longitudinal and they do not include a comparable measure of vertical differentiation. Due to these limitations, 8 of Dewar and Hage's (1978) 12 propositions cannot be tested with the present data. The four propositions that can be and are tested with the present data are as follows:

1. *The greater the level of size, the greater the level of horizontal differentiation.*
2. *The greater the level of task scope, the greater the level of horizontal differentiation.*
3. *The greater the level of size, the greater the level of complexity.*
4. *The greater the level of task scope, the greater the level of complexity.*

Method and Results

The data were collected from 77 small business organizations located in a small, rural, mid-atlantic university community. The organizations were selected on a "quota" basis (Kerlinger, 1973) by university graduate students who conducted personal interviews with the firms' general managers in their respective business offices in 1976. A detailed description of the sample, the sampling procedure, and the data collection procedure may be found in Paulson and Stump (1979). The mean number of employees was 20.5, and 90 percent had fewer than 50 employees. The population consisted of 359 organizations and, based on known characteristics of the population, the sample appeared to be representative. Measures of the four concepts discussed in this paper are shown in Table 1 alongside those used by Dewar and Hage (1978). In constructing these measures, a conscious attempt was made to duplicate Dewar and Hage's reported measures despite the very different sectors of operation of the two samples of organizations. For example, among retail stores, the task scope measure classes the sale of services as offering more variety to the customer than does the sale of goods in the same sense that, among public agencies, more extensive involvement with clients offers more variety than does less extensive involvement. Both situations require the (usually) more difficult and complicated direct personalized contact with the customer/client.

TABLE 1
Empirical Measures, Ranges, Means, and Standard Deviations for Levels of Size, Task Scope, Complexity, and Horizontal Differentiation

Concept	*This Study Small Business Organizations (N=77)*	*Dewar and Hage Study Social Service Agencies (N=16)*
Size	Total number of full+part time employees including owners; transformed to logarithm for analysis. 1-255; 20; 34.	The number of all full time personnel, one-half the number of part time personnel and one-tenth the number of volunteers; transformed to logarithm for analysis. 10-691; 146; 215.
Task scope	Variety of possible customer needs that the firm can satisfy through products and services sold. Three categories: 3=services (motel, restaurant, bank, etc.); 2=general goods (hardware, department, clothing, etc.); 1=specialty goods (jewelry, flowers, health foods, etc.). 1-3; 1.90; .75.	Degree of involvement with clients. Three categories: 3=24 hours; 2=day-long or half day; 1=scheduled visit; plus the number of types of disabilities dealt with where 3=8 or more; 2=4 to 7; 1=1 to 3. 3-6; 3.81; 215.
Complexity	Number of occupational specialties that represent distinctive types of knowledge and training; manager, sales clerk, bookkeeper, janitor, secretary, security guard, cook, mechanic, teller, etc. *Not* simply job titles. "Restaurant busboy" and "restaurant dishwasher" would constitute a single specialty whereas "insurance broker" and "insurance salesperson" would constitute two specialties. 1-10; 3.53; 1.64.	The number of occupational specialties that represent distinct kinds of knowledge involving special tools or techniques; not simply job titles. 3-27; 11.90; 7.26.
Horizontal differentiation	Number of departments or work units distinguished by the presence of a supervisory position that has primary responsiblity for overseeing the work of the unit. 1-9; 2.44; 1.78.	The number of departments or work units with at least two levels of personnel and four or more persons organized by output or work-flow technology. 1-8; 3.68; 2.02.

Table 2 presents summary statistics of a correlational and regression analysis of the variables used in this study alongside those reported by Dewar and Hage for their 1964 data. The corresponding 1967 and 1969 values were quite similar to those of 1964 and the conclusions of this paper

TABLE 2
Correlation and Regression Analysis of Levels of Complexity and Horizontal Differentiation with Levels of Size and Task Scope

	Independent Variables			
	This Study		*Dewar and Hage Study*[a]	
Dependent Variables	*Size*	*Task Scope*	*Size*	*Task Scope*
Complexity:				
Zero-order correlation (*r*)	.74	.39	.44	.45
Partial regression (raw)	1.07	.24	24.80	23.40
Partial regression (std)	.70	.11	.40	.42
Adjusted multiple correlation (R^2)	.55		.26	
Horizontal differentiation:				
Zero-order correlation (*r*)	.77	.25	.55	.15
Partial regression (raw)	1.32	−.15	.94	.17
Partial regression (std)	.79	−.06	.54	.11
Adjusted multiple correlation (R^2)	.58		.21	

[a] Dewar and Hage, 1978, pp. 122-123, Tables 3, 4; p. 127, Tables 9, 10.

are the same regardless of the set used. Thus only one is presented for the sake of brevity.

Discussion

First, regarding levels of horizontal differentiation, as predicted by levels of size (Hypothesis 1) and task scope (Hypothesis 2), the findings of the two studies are quite similar. The logarithm of size has a much stronger (positive) effect on horizontal differentiation than does task scope. Although the present study did not include comparable data, it is important to note that although Dewar and Hage found that change in task scope also was less important than levels of size in predicting horizontal differentiation, it was more important than any of their other variables. Because, among small stores, the phenomenon of adding departments (increasing horizontal differentiation) is quite plausibly a function of an increase in the variety of products and services sold (increasing task scope), it may reasonably be assumed that the effects of task scope would be the same as in the Dewar and Hage (1978) data. Thus a tentative conclusion is that the relations among the variables found by Dewar and Hage for public service organizations are quite similar to those for private retail sales organizations. The implications concerning complexity as a dependent variable, however, are not as clear.

With levels of complexity as the dependent variable, the findings show that only size has an important (positive) relationship (Hypothesis 3); task scope does not have a substantively important relationship (Hypothesis 4). This is in contrast to the Dewar and Hage cross-sectional analysis in which both size and task scope had important and similar effects on complexity. In Dewar and Hage's (1978) full analysis, however, only change in task scope was able to predict changes in complexity. Thus task scope is equal to, or more important than, size in explaining complexity for social service organizations. However, among small organizations in the private sector, the present data suggest the opposite. As Dewar and Hage (1978) indicate, their findings also are opposite to those of Hickson et al. (1969), who studied work organizations in the private sector—similar to those of the present research. The conclusion drawn, then, is that in terms of explaining complexity, size is more important than technology for organizations in the private sector, but for organizations in the public sector, technology is more important than size. The rationale for small businesses is that the addition of different items to sell (increased task scope) does not require the addition of more and different specialized occupational skills (complexity). But, because certain occupational skills nevertheless are required for the running of a store, as soon as resources become available for expansion (increased size) small businesses will add occupational specialties in terms of a bookkeeper, secretary, janitor, etc., which in turn will "free" the owner to do the managing.

An alternative to this general "sector" explanation would be to focus on the variable of size. As Dewar and Hage (1978) emphasize in their conclusions, the effects of task scope are greatest in larger organizations and their organizations were, on the average, larger than those of the present study. Thus the finding of a lack of task scope influence in the present study would be consistent. This would be similar to Hickson et al.'s (1969) approach to reconciliating the difference between their findings and Woodward's (1965). Hickson et al. (1969) argued that among large organizations (their sample) technology does not affect structure, but among small organizations (Woodward's sample) it does. Because Woodward and Hickson et al. studied the same type of organization, the use of size difference as a reconciliator was quite reasonable. However, because Dewar and Hage's and the present study's organizations are very different types and because the present study would counter Hickson et al.'s size explanation, the size explanation is not as acceptable as the "sector" explanation.

In summary, the data on small businesses provide evidence for (1) further support of Dewar and Hage's (1978) findings regarding levels of horizontal differentiation and (2) further explication of the Dewar and Hage (1978) findings regarding levels of complexity. If the field of the empirical study of organizational structure becomes more open to replication, even as limited as that reported here, a beginning can be made in resolving the many contraditions and empirical inconsistencies that now characterize the field.

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AN EVALUATION OF TWO ALTERNATIVES TO THE VROOM/YETTON NORMATIVE MODEL

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In a recent critique of the Vroom/Yetton contingency model of leader behavior, Field (1979) concludes that "there are a number of criticisms of the model that question its validity and utility" (p. 256). Field then offers two theoretical alternatives to the model, each judged to be more parsimonious than that offered by Vroom and Yetton and each thought to exhibit equal or greater validity and utility. The present investigation tests these conjectures through an empirical evaluation of each alternative against the Vroom/Yetton formulation.

Vroom/Yetton Normative Model

For problems or decisions within the area of discretion of a manager and having some foreseeable consequences on his or her subordinates, the Vroom/Yetton normative model (Vroom & Yetton, 1973) attempts to prescribe the decision making method most appropriate for the situation. The five methods—labeled AI, AII, CI, CII, and GII—vary in the degree to which the decision making strategy permits subordinates to participate in the process and to influence the final decision or solution. AI and AII are variants of autocratic decision making. (AI permits no subordinate involvement in the decision; AII permits subordinates to respond to specific requests for information from the decision maker.) CI and CII are variants of consultative decision making. (CI involves one-to-one consultation with individual subordinates; CII involves consultation with subordinates in a group meeting.) GII is group decision making.

Choice from among these alternative decision making methods is governed by the presence or absence of seven fundamental *problem attributes* corresponding to situational variables believed to influence the effectiveness of the five decision processes. These attributes can be expressed in terms of yes or no answers to seven diagnostic questions: (a) Does the problem possess a quality requirement? (b) Does the leader have sufficient information to make a high quality decision? (c) Is the problem structured? (d) Is acceptance of the decision by subordinates important for effective implementation? (e) If the leader were to make the decision by himself, is it reasonably certain that it would be accepted by subordinates? (f) Do subordinates share the organizational goals to be attained in solving this problem? (g) Is conflict among subordinates likely over preferred solutions?

Decision processes are matched to decision situations by seven "rules" (i.e., contingencies) which, using set theoretic notation, are expressed in the top portion of Table 1. Referring to the diagnostic questions listed above, the literal translation of Rule 1 of the Vroom/Yetton model (Table 1) would be: "If A and not B, then not AI." The figurative translation of the same rule would be: "If the quality of the decision is important and the leader does not possess sufficient information to solve the problem by himself, then an autocratic decision without subordinate input would be inappropriate."

TABLE 1
Normative Models of Participation in Decision Making[a]

Vroom/Yetton Model
(1) If $A \cap \overline{B}$, then $\overline{AI}$
(2) If $A \cap \overline{F}$, then $\overline{GII}$
(3) If $A \cap \overline{B} \cap \overline{C}$, then $\overline{AI}$, $\overline{AII}$, $\overline{CI}$
(4) If $D \cap \overline{E}$, then $\overline{AI}$, $\overline{AII}$
(5) If $D \cap \overline{E} \cap G$, then $\overline{AI}$, $\overline{AII}$, $\overline{CI}$
(6) If $\overline{A} \cap D \cap \overline{E}$, then $\overline{AI}$, $\overline{AII}$, $\overline{CI}$, $\overline{CII}$
(7) If $D \cap \overline{E} \cap F$, then $\overline{AI}$, $\overline{AII}$, $\overline{CI}$, $\overline{CII}$

Maier's Model
(1) If $A \cap \overline{D}$, then AI
(2) If $\overline{A} \cap D$, then GII
(3) If $\overline{A} \cap \overline{D}$, then AI
(4) If $A \cap D$, then AI, AII, CI, CII or GII

Field's Model
(1) If $D \cap \overline{E} \cap (F \cup \overline{A})$, then GII
(2) If $\overline{D} \cup E \cup (\overline{F} \cap A)$, then CII

[a] The bar (e.g., $\overline{F}$, $\overline{AI}$) is a symbol of exclusion (read *not*); the cap ($\cap$) is a symbol of intersection (read *and*); the cup ($\cup$) is a symbol of union (read *or*).

The rules are stated in such a way that they *contra*indicate *in*appropriate decision methods rather than indicate appropriate decision methods. Moreover, the rules are of two different types. The first three rules are intended to protect the quality of the resulting decision by eliminating methods with a substantial probability of resulting in decisions that are technically unsound. The remaining four rules are intended to protect the acceptance of the decision by subordinates, eliminating methods that have a substantial probability of proving ineffective due to the resistance of subordinates or the lack of needed support from them during implementation.

These rules eliminate all but one process for certain types of problems or decisions, thereby prescribing a unique solution. For other problems, however, from two to five processes can remain in what is called the "feasible set." In these cases, choice from among feasible processes should be made by the leader based on considerations not represented in the problem attributes, such as time pressure (dictating a choice of the most autocratic alternative within the feasible set) or concern with development of subordinates (dictating a choice of the most participative alternative within the feasible set). A more complete discussion of the model can be found in Vroom and Yetton (1973).

Maier's Model

The first alternative to the Vroom/Yetton (1973) model offered by Field is adopted from a four-way classification of problem situations first proposed by Maier (1970):

> A Type I problem has a quality requirement, acceptance is likely to be obtained easily, and the decision should be made by the leader. Type II problems do not have a quality requirement but acceptance is critical. These problems should be resolved by group decision. Type III problems do not have quality or acceptance requirements and should be decided by the flip of a coin....Type IV problems require both quality and acceptance and are solved by using managerial skills. These leadership skills can be directed toward persuasion or group discussion but Maier emphasizes the latter (Field, 1979, p. 255).

Using the terminology of Vroom and Yetton, these prescriptions (labeled "Maier's model") are represented by the second set of decision rules in Table 1. It is noteworthy that this alternative model employs only two of Vroom and Yetton's (1973) seven problem attributes and that a single decision method is prescribed for three of the four problem types.

A caveat is warranted. Although this comparative investigation requires that the Vroom/Yetton model and the two alternatives be expressed using a common set of symbols and a common format, Maier's original work did not use the symbols, nor were certain of his prescriptions as specific as the contingency rules contained in Table 1 imply. In this study, for example, Maier's "coin toss" is represented as an AI (i.e., autocratic) process, although it could be alternatively interpreted as the absence of any process. Also, Maier's discussion of Type IV problems is interpreted as providing an essentially unrestrictive leadership prescription. Although he seems to emphasize the use of participative techniques for such problems, he clearly does not preclude the appropriateness or utility of more autocratic strategies.

Field's Model

The second alternative model is a modification to the Vroom/Yetton formulation:

> If acceptance of the decision by subordinates is critical to effective implementation and it is not reasonably certain that subordinates would accept an autocratic decision, but they share organizational goals (or decision quality is not important) use GII, otherwise use CII (Field, 1979, p. 256).

Employing set theoretic notation, these prescriptions are represented by the third set of decision rules in Table 1. It is of note that this alternative model employs four of Vroom and Yetton's (1973) seven problem attributes and that a single decision method is prescribed for each combination of problem attributes. Moreover, this alternative model employs only the two most participative of Vroom and Yetton's (1973) five decision processes. That is, a group meeting is specified for each and every decision affecting subordinates encountered by the manager.

It also is noted that a decision process that is consistent with the prescriptions of Field's model will always be consistent with the prescriptions of the original Vroom/Yetton model. The reverse, however, does not hold. From the nature of the rules, it can be shown that behavior in agreement with Field's model is a sufficient (but not necessary) condition for agreement with the Vroom/Yetton model. On the other hand, behavior in agreement with the Vroom/Yetton model is a necessary (but not sufficient) condition for agreement with Field's model. An example will illustrate this point. For the decision situation having attributes $A \cap \bar{B} \cap C \cap D \cap E \cap \bar{F} \cap G$ (see footnote to Table 1) the Vroom/Yetton model prescribes the feasible set AII, CI and CII. (AI violates Rule 1; GII violates Rule 2.) Field's model prescribes CII. Therefore, Field's model is a sufficient condition for insuring the choice of a response within the Vroom/Yetton feasible set. However, following the Vroom/Yetton model (e.g., selecting AII) does not necessarily insure the choice of a response prescribed by the alternative model.

No similar relationship exists between the alternative models. Indeed, circumstances can exist in which the application of each of Maier's prescriptions would necessarily require a violation of Field's prescriptions.

Method

The Vroom/Yetton model was compared with the two alternative models through additional analysis of data collected in a previous investigation (Vroom & Jago, 1978). That research was specifically designed to test the validity of the Vroom/Yetton prescriptions and included comparisons that assessed the relative efficacy of the Vroom/Yetton model against other simpler models offering no situational contingencies. The alternative models suggested by Maier and Field are less complex than the Vroom/Yetton model but more complex than the noncontingent models used as comparisons in those analyses. The proposed analyses therefore extend those originally reported by Vroom and Jago (1978).

From a variety of organizations 96 managers were asked to describe two actual decision making situations encountered within their roles. For each situation, the manager then (a) specified (from the list AI, AII, CI, CII, and GII) the actual decision process used in solving the problem or in making the decision and (b) rated, on 7-point scales, the overall effectiveness of the outcome, the quality (e.g., rationality or technical adequacy) of the decision, and the degree to which the affected subordinates accepted (i.e., were committed to) the decision or solution achieved. Finally, subjects were trained in the meaning of the seven problem attributes used by the normative model to diagnose decision making situations and, without knowledge of the specific normative contingencies, employed these problem attributes to diagnose the actual decisions encountered. Additional details regarding the method of data collection are reported by Vroom and Jago (1978).

Because all the information regarding each decision situation was collected from a single source (i.e., the manager who encountered the decision), demand characteristics may represent a threat to the external validity of the research design. As Vroom and Jago (1978) argue, however, the Vroom/Yetton model prescribes behavior on the basis of several complicated interactions among seven problem attributes and five decision processes and, as a consequence, subjects could not be expected to "guess" the hypotheses to be tested and supply supporting data. In fact, managers' familiarity with the ubiquitous participative prescriptions of human relations theorists such as Blake and Mouton (1964) and Likert (1961) would suggest that any subjects so motivated in this investigation would be more likely to add support to Field's highly participative alternative model against which the validity of the Vroom/Yetton model is to be compared.

Results

From the 96 managers, 181 written cases were collected. Employing the decision rules contained in Table 1, the reported behavior of the respondent was compared to that prescribed by each of the three normative models. For each situation the decision process used to solve the problem or make the decision was coded as conforming or not conforming to the prescriptions of each model. The results of this coding reveal that 117 decisions (65 percent) conformed to the Vroom/Yetton prescriptions, 143 decisions (79 percent) conformed to Maier's prescriptions, and 59 decisions (33 percent) conformed to Field's prescriptions. Within the subset decisions conforming to the Vroom/Yetton prescriptions ($N = 117$), 94 (80 percent) conformed to Maier's model and 59 (50 percent) conformed to Field's model. However, of the 143 decisions that conformed to Maier's prescriptions, only 49 (34 percent) also conformed to Field's prescriptions. These comparisons illustrate the substantial overlap between each alternative and the Vroom/Yetton model yet the relative incompatibility of the two alternatives. It is entirely possible (and probable) for one's behavior to conform to either of the two alternative models and the Vroom/Yetton model. However, in only some situations can one's behavior conform to both the alternatives, these models containing several contradictory prescriptions.

To assess the relative validity of the Vroom/Yetton prescriptions, two-way analyses of variance were performed using ratings of overall effectiveness, decision quality, and subordinate acceptance as criteria and conformity with the prescriptive models as grouping variables. In the first set of analyses, the Vroom/Yetton model was compared with Maier's model. In the second set, the Vroom/Yetton model was compared with Field's model.

Because the method of assigning decision cases to the grouping variables did not insure equal cell sizes, the analyses were performed using the hierarchical (step-down) regression procedure of Overall and Spiegel (1969). Conformity to the alternative model under consideration (yes versus no) initially was given priority in the partition of any shared variance because of the parsimony of its expected relationships with the criteria. Conformity to the Vroom/Yetton model (yes versus no) then was introduced as a potential predictor of residual variance not explained by the alternative model alone.

Tables 2 and 3 contain the cell means produced by the 2×2 classification in each of the three ANOVAs pertaining to Maier's model and each of the three ANOVAs pertaining to Field's model. These analyses offer some basis for the alternative models in that the ratings of decision criteria are greater for behavior conforming to these models than for behavior failing to conform to these models. In analyses pertaining to Field's model (Table 3) this first main effect (*d.f.* = 1) reaches conventional levels of statistical

TABLE 2
Comparison of the Vroom/Yetton Model[a] with Maier's Model

Conformity to Vroom/Yetton Model	*Conformity to Maier's Model* *Yes*	*No*	*Total*
Yes			
Effectiveness[a]	5.18	4.78	5.10
Quality	5.06	4.13	4.88
Acceptance	5.44	4.83	5.32
N	94	23	117
No			
Effectiveness	3.27	2.60	3.11
Quality	4.12	2.87	3.83
Acceptance	3.12	3.47	3.20
N	49	15	64
Total			
Effectiveness	4.53	3.92	4.40
Quality	4.74	3.63	4.51
Acceptance	4.65	4.29	4.57
N	143	38	181

[a] Decision outcomes are measured on 7-point scales. Higher values represent greater overall effectiveness, decision quality, or decision acceptance.

TABLE 3
Comparison of the Vroom/Yetton Model with Field's Model

Conformity to Vroom/Yetton Model	*Conformity to Field's Model* *Yes*	*No*	*Total*
Yes			
Effectiveness[a]	5.24	4.97	5.11
Quality	5.22	4.53	4.88
Acceptance	5.36	5.28	5.32
N	59	58	117
No			
Effectiveness	—	3.11	3.11
Quality	—	3.83	3.83
Acceptance	—	3.20	3.20
N	0[b]	64	64
Total			
Effectiveness	5.24	3.99	4.40
Quality	5.22	4.16	4.51
Acceptance	5.36	4.19	4.57
N	59	122	181

[a] Decision outcomes are measured on 7-point scales. Higher values represent greater overall effectiveness, decision quality, or decision acceptance.

[b] Because conformity to Field's model is a sufficient condition for conformity to the Vroom/Yetton model, no decisions fall into this category.

significance in tests involving overall effectiveness ($F = 13.61, p < .01, \eta^2 = .06$), decision quality ($F = 11.76, p < .01, \eta^2 = .06$), and decision acceptance ($F = 15.23$, $p < .01$, $\eta^2 = .07$). In analyses pertaining to Maier's model (Table 2) this first main effect reaches statistical significance only for ratings of decision quality ($F = 10.05, p < .01, \eta^2 = .05$).

Of greater concern, however, is the second main effect in each of the two-way analyses. After the influence of conformity to Maier's prescriptions has been removed as an explanatory variable in the first set of analyses, a main effect for conformity to the Vroom/Yetton prescriptions (*d.f.* = 1) accounts for significant additional variance in overall effectiveness ($F = 35.56$, $p < .01$, $\eta^2 = .17$) decision quality ($F = 11.50$, $p < .01$, $\eta^2 = .06$), and decision acceptance ($F = 51.72$, $p < .01$, $\eta^2 = .22$). Similarly, after the influence of conformity to Field's prescriptions has been removed as an explanatory variable in the second set of analyses, a main effect for conformity to the Vroom/Yetton prescriptions accounts for significant additional variance in overall effectiveness ($F = 23.13$, $p < .01$, $\eta^2 = .11$), decision quality ($F = 4.02$, $p < .05$, $\eta^2 = .02$), and decision acceptance ($F = 36.73$, $p < .01$, $\eta^2 = .16$). These analyses clearly reveal that the Vroom/Yetton model possesses predictive power beyond that provided by either alternative model.

When the hierarchical ordering of predictors is reversed and agreement with the Vroom/Yetton model is given priority and introduced first in the step-down procedure, the analyses of variance produce different results. In this case, any variance shared between models is attributed to the Vroom/Yetton formulation, thereby increasing the already significant *F* and η^2 values for this model. Of more interest are the consequences of this hierarchical reversal on the four significant effects associated with the alternative models. In these analyses, the unique effect of Maier's model on decision quality remains statistically significant ($F=9.10$, $p<.01$, $\eta^2=.05$). However, all three effects associated with Field's model are reduced to nonsignificance (overall effectiveness, $F=.48$; decision quality, $F=3.65$; decision acceptance, $F=.05$). In addition to its unique effect, the Vroom/Yetton model, therefore, also is able to account for the variance previously attributed to Field's model.

Additional analyses are possible that compare the alternative models with each other. These analyses, available from the senior author, reveal the predictive superiority of Field's model over Maier's model. This is not unexpected given that Field's prescriptions are more similar to those of Vroom and Yetton than are Maier's prescriptions.

Discussion

Employing a reanalysis of previously collected data, the present investigation evaluates the Vroom/Yetton normative model against two simpler alternative models and reveals that the relative complexity of the Vroom/Yetton contingencies is indeed warranted. The particular Vroom/Yetton prescriptions explain significant variance in decision criteria beyond that explained by either proposed alternative. Moreover, in all but one comparison the alternative models fail to explain significance variance beyond that which can be explained by the Vroom/Yetton model. Taken together these findings suggest that each of the two alternatives achieves parsimony only at the expense of predictive power.

Although the evidence reaffirms the validity and utility of the Vroom/Yetton model, Field's model may appear to remain an attractive alternative for use in leadership training. His formulation guarantees conformity to the Vroom/Yetton prescriptions, yet his rules presumably are easier to learn and apply because they involve fewer situational variables and fewer normative contingencies. However, the apparent attractiveness may be misleading. The behavior of untrained managers violates Field's prescriptions substantially more often than such behavior violates the prescriptions of either Maier's model or the Vroom/Yetton model. Because its highly participative prescriptions represent a large departure from the decision making style of most managers, implementing Field's model would require some rather dramatic behavioral changes that may meet with some resistance. Although its prescriptions are indeed easy to learn, Field's model may be quite difficult for some managers to internalize and practice. On the other hand, the Vroom/Yetton model may be more difficult to learn initially but more easily internalized and implemented.

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WOMEN AS MANAGERS: ATTITUDES AND ATTRIBUTIONS FOR PERFORMANCE BY MEN AND WOMEN

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In recent years, a great deal of attention has been focused on the problems encountered by women in their efforts to gain access to traditionally male occupations. Specifically, a number of studies have dealt with the problems of women in managerial positions (Garland & Price, 1977; Rose & Andiappan, 1978; Rosen & Jerdee, 1974b; Terborg, 1977; Terborg & Ilgen, 1975; Terborg, Peters, Ilgen, & Smith, 1977). Terborg (1977) notes that, although there is evidence to support the notion that stereotyping is an important hindrance to women attempting to reach the managerial levels, other factors, such as women's self-concepts also must be considered. Nonetheless, much of the recent research has been concerned with the influence of stereotypes on personnel decisions regarding women for both managerial and nonmanagerial positions (Brief & Wallace, 1976; Briscoe & Mainstone, 1978; Rosen & Jerdee, 1974a).

Several shortcomings of a number of these studies are pointed out by Terborg (1977). The most important of these seems to be the failure of experimenters to obtain independent measures of stereotypes, and a second problem is the almost complete lack of replication. Several developments would indicate a more constructive approach to research on these problems. One major development has been the Women as Managers Scale, or WAMS (Peters, Terborg, & Taynor, 1974), which is designed for the independent assessment of sex-role stereotypes and which has been used successfully in several studies (Garland & Price, 1977; Terborg & Ilgen, 1975; Terborg et al., 1977). Furthermore, several researchers have begun looking more closely at potential discrimination and investigating the way success and/or failure is dealt with for men and women.

The present study is a replication of the study reported by Garland and Price (1977), which investigated the relationships between attitudes towards women as managers (as measured by WAMS) and the attributions for the success and failure of women managers. One difference in the present study is the utilization of both male and female judges.

Hypotheses

Specifically, the following hypotheses will be tested:

1. *Clear descriptions of the success or failure of a woman manager will not influence attitudes toward women as managers, because these attitudes are seen as being relatively stable, and not situation specific.*
2. *For both male and female subjects, attributions for the success or failure of a woman manager will be significantly related to the attitudes toward women as managers.* Specifically, subjects with positive attitudes toward women as managers will tend to attribute success to internal factors (hard work and ability) and failure to external factors (luck and the nature of the job). Thus, in the success conditions, there should be significant positive correlations between WAMS scores and attributions to ability and effort and significant negative correlations with attributions to luck and the nature of the job. These correlations should be reversed in the failure condition.
3. *On the average, women will have more positive attitudes toward women as managers than will men.*

Subjects and Procedures

A total of 226 subjects participated in the experiment, of which 143 were male and 83 female. All subjects were advanced undergraduate business students enrolled in a course on individual and group behavior in organizations. All subjects participated in the experiment voluntarily, outside of class time.

Measures

Description of Success or Failure—The success or failure of a fictitious woman (Joan Baxter) was manipulated by presenting a scenario describing her first year's performance at the Universal Electric Company. The descriptions used were identical to those used by Garland and Price (1977). The basic scenario is presented below with the phrases that were changed to indicate her success or failure placed in parentheses with the success version preceding the failure version:

> Miss Joan Baxter joined the Universal Electric Company as assistant plant manager approximately one year ago. While in this capacity, she introduced changes which resulted in (decreased/increased) operating costs, and (increased/decreased) productivity in the plant. As a result of her (achievements/failures), Miss Baxter was (promoted to plant manager/dismissed) after just twelve months with the company.

Attitudes Toward Women as Managers—Attitudes toward women as managers were assessed using the WAMS. The instrument consists of 21 statements about women in management, 10 of which are worded in unfavorable terms. Subjects were asked to indicate how strongly they agree or disagree with each statement using 7-point Likert scales (1 = strongly disagree, 7 = strongly agree). The scale is scored such that scores range from 21 to 147, with higher scores indicating more positive attitudes toward women as managers. The WAMS' psychometric properties have been carefully studied, and they have been reported by Peters et al. (1974).

Attributions for Performance—Subjects also were asked to consider four possible causes for the success/failure of Joan Baxter as described. In the success condition these four were ability, hard work, good luck, and an easy job. In the failure condition they were lack of ability, lack of hard work, bad luck, and a difficult job. Subjects indicated the extent to which they felt that Joan Baxter's performance was due to each possible cause, using 9-point Likert-type scales in which a score of 1 indicated that the subject felt a potential cause was not at all important, and a score of 9 indicated that the subject felt a potential cause was extremely important. As will be discussed below, however, not all subjects were asked to make these attributions for Joan Baxter's performance.

Experimental Manipulations

The testing of all three hypotheses required variations in the questionnaires. As in the Garland and Price (1977) study, it was hypothesized that attitudes toward women as managers are not affected by clear descriptions of the success or failure of a woman manager. In order to test this hypothesis, it was necessary for the description of Joan Baxter's performance to precede the WAMS. A total of 110 subjects were used to test this hypothesis. However, eight questionnaires were dropped from the analysis because of missing data. Fifty-five subjects (30 males and 25 females) received the success description, and 47 subjects (33 males and 14 females) received the failure description. Afterwards, these subjects completed the WAMS but were not asked to make any attributions for Joan Baxter's performance.

In order to test the remaining two hypotheses concerning relationships between WAMS scores and attributions for success and failure made by male and female subjects, it was necessary for the descriptions to follow the WAMS in the questionnaires. A total of 124 subjects (80 males and 44 females) were used to test these hypotheses. Of these, 61 subjects (45 males and 16 females) received the success description, and 63 (35 males and 28 females) received the failure description.

Results

The first hypothesis stated that attitudes toward women as managers should not be affected by descriptions of the success or failure of a woman manager. The present test involved a three way analysis of variance that included two levels of stimulus presentation (WAMS preceding description and WAMS following description), two conditions of performance (success and failure), and two levels of subjects sex (male and female). The effect for stimulus presentation was not significant ($F=.73$, n.s.), nor was the sex × stimulus presentation interaction ($F=.03$, n.s.). Additionally, the effect for condition was not significant ($F=1.35$, n.s.), nor was the sex × description interaction ($F=1.73$, n.s.), the stimulus presentation × condition interaction ($F=1.11$, n.s.), or the three-way sex × condition × stimulus presentation interaction ($F=1.88$, n.s.). The mean WAMS scores for males under conditions of success and failure were not significantly different from each other ($t=1.46$, n.s.). This pattern of results indicates that WAMS scores were affected by subject sex ($F=90.21$, $p<.001$), but not by descriptions of success or failure. Thus, the results of Garland and Price (1977) are replicated in the present study.

The second hypothesis stated that for all subjects there would be a relationship between WAMS scores and attributions for Joan Baxter's success or failure. Because previous research indicates that males and females have dissimilar attitudes towards women in management, the possibility existed that performance outcomes also might be attributed to different factors by the two groups. It was decided, therefore, to analyze male and female subjects' ratings of performance attributions separately. Table 1 presents the mean attributions made by male subjects in both conditions, and the correlations between WAMS scores and attributions in both conditions. As can be seen from the correlational results, the second hypothesis is completely supported for males concerning the attributions to ability and effort in both conditions. (Garland and Price, 1977, it will be recalled, failed to find any support in the failure condition.) WAMS scores were positively related to ability ($r=.49$, $p<.01$) and effort ($r=.33$, $p<.05$) in the success condition, and negatively related to ability ($r=-.18$, $p<.10$) and effort ($r=-.41$, $p<.01$) in the failure condition.

It also is noted that, in general, male subjects were more likely to attribute success to ability than failure to a lack of ability ($t=4.26$, $p<.01$), and the same is true for effort ($t=8.75$, $p<.01$). Although males in general attributed success more frequently to ability and effort, and failure more frequently to the nature of the job, there still was a tendency for men with

TABLE 1
Comparisons of Mean Attribution Ratings for Success and Failure and Correlations With WAMS Scores for Male Subjects

Causes for Performance[a]	*Success*			*Failure*			
	$\bar{x}$	*s.d.*	r[b]	$\bar{x}$	*s.d.*	r[b]	*t-test*[c]
Ability	7.91	1.28	.49***	6.09	2.49	-.18*	4.26***
Effort	8.29	.97	.33**	4.26	2.89	-.41***	8.75***
Luck	3.22	2.10	-.05	3.71	2.77	-.03	<1.00
Nature of the job	3.02	2.41	-.07	6.06	2.47	.05	-5.51***

[a] Note that in failure condition, these causes were stated to be lack of ability, lack of effort, bad luck, and difficult job.

[b] These are correlations between WAMS scores and attribution ratings.

[c] These are t-tests comparing attribution ratings in success and failure conditions.

*$p < .10$

**$p < .05$

***$p < .01$

TABLE 2
Comparisons of Mean Attribution Ratings for Success and Failure and Correlations With WAMS Scores for Female Subjects

Causes for Performance[a]	*Success*			*Failure*			
	$\bar{x}$	*s.d.*	r[b]	$\bar{x}$	*s.d.*	r[b]	*t-test*[c]
Ability	8.81	.40	.20 n.s.	6.04	2.73	-.18 n.s.	4.03*
Effort	8.69	.48	.15 n.s.	4.71	1.79	-.003 n.s.	5.63*
Luck	3.69	1.66	-.07 n.s.	3.57	2.56	.05 n.s.	<1.00
Nature of the job	1.19	.40	-.05 n.s.	5.36	2.67	.02 n.s.	-6.18*

[a] Note that in failure condition, these causes were stated to be lack of ability, lack of effort, bad luck, and difficult job.

[b] These are correlations between WAMS scores and attribution ratings.

[c] These are t-tests comparing attribution ratings in success and failure conditions.

*$p < .01$

high WAMS scores to be more likely to follow that pattern than men with low WAMS scores.

Table 2 presents both the mean attribution ratings made by female subjects in the success and failure conditions and the correlations between these attributions and WAMS scores. As can be seen, there was a significant tendency for women to attribute success to ability rather than failure to a lack of ability ($t = 4.03$, $p < .01$) and success to effort rather than failure to a lack of effort ($t = 5.63$, $p < .01$), and to attribute failure more frequently to the nature of the job than success ($t = 6.18$, $p < .01$). There were no differences in attributions to luck. Also, as is shown in Table 2, no correlations between WAMS scores and attributions were significant. Thus, for female subjects, little support was obtained for the second hypothesis. For male subjects, however, virtually complete support was found for this hypothesis.

The final hypothesis stated that women would tend to have more positive attitudes toward women as managers than would men. This was found

The final hypothesis stated that women would tend to have more positive attitudes toward women as managers than would men. This was found to be the case. The mean WAMS score for men (109.23) was significantly lower ($p < .01$) than that for women (131.65). The result was a main effect for subject sex ($F = 37.15$, $p < .01$), which is consistent with other results obtained with the WAMS and closely matches the results reported by Peters et al. (1974).

Discussion

All three hypotheses received at least partial support in the present study. Garland and Price's (1977) finding that WAMS scores were not affected by clear descriptions of the success or failure of women managers was replicated for both male and female subjects. These descriptions, however, did result in manipulations powerful enough to cause differences in attributions made for success and failure. For males, as predicted, there was a significant relationship between WAMS scores and subjects' attributions, at least to ability and effort, but nonsignificant relationships were obtained for female subjects. Not only did women have higher scores on the WAMS (131.65 vs. 109.23) than men on the average, but women were more consistent. The standard deviations for women's WAMS scores were almost one-half—10.84—those for men—20.60. Although the standard deviations for females are low, it is uncertain that they are low enough to lead to no effect. A more likely explanation might be that the presence of low standard deviations for success attributions was the culprit (see Tables 1 and 2). These factors, therefore, may have served to reduce the probability of finding any significant correlations between attributions and WAMS scores for women.

In general, males and females tended to attribute success and failure to similar factors. That is, for both male and female subjects, there were significant differences in the way success and failure were attributed to ability, effort, and the nature of the job. Nonetheless, for males there were differences in the way high and low scorers on the WAMS made attributions. Although further research on issues of sex discrimination must consider the sex of the judge, the results of the present study would indicate that males and females attribute success and failure in like fashion.

Future research on performance attributions should be conducted in field settings with actual employees, particularly male and female managers, who experience real success and failure. In these more complex settings, researchers may determine the generalizability of the ability, effort, luck, and task attributions, as well as the degree to which situational and other factors come into play.

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THE FUNCTION AND MEANING OF WORK AND THE JOB: MORSE AND WEISS (1955) REVISITED[1]

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Among the classics in the literature of organizational psychology is an article by Morse and Weiss (1955), who argued that the notion of work as simply a means towards the end of earning a living is in serious error. As the basis for their argument, they demonstrated from a national sample of employed men that having a job serves many functions other than earning money for economic support (e.g., avoiding boredom, providing opportunities for social contact, promoting personal fulfillment).

One of the most interesting aspects of the Morse and Weiss study was their conclusion that "even if [workers] had enough money to support themselves, they would still want to work" (1955, p. 191). This conclusion is especially impressive because the question that Morse and Weiss posed to their sample was one that approached fantasy fulfillment (i.e., many people at coffee breaks, office parties, etc., often speak fondly of the prospect of having enough money to quit work, retire at an early age, and enjoy life). The precise wording of the question employed by Morse and Weiss was: "If by some chance you inherited enough money to live comfortably without working, do you think you would work anyway or not?" Of the 401 employed men asked this question, 80 percent responded they would want to keep on working.

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[1] The data utilized in this study were made available by an interuniversity research consortium. The data for the 1972-1977 General Social Survey, National Data Program for the Social Sciences, were originally collected by James A. Davis of the National Opinion Research Center, University of Chicago, and were distributed by Roper Public Opinion Research Center, Williams College. Neither the original collector of the data nor the consortium bear any responsibility for the analyses or interpretations presented herein.

Anecdotal support exists for the behavioral manifestation of this predisposition. For example, one report concerns several London factory workers who won substantial sums of money from football pools. With wise investment, the sums of their individual winnings would have provided sufficient income for these men to live comfortably for the remainder of their lives. Yet each of the men returned to work after a brief vacation. Perhaps even more amazing in these cases is the fact that these men held jobs that could be reasonably described as dull, routine, and repetitive (Brown, 1954).

Morse and Weiss observed that one of the significant correlates of preference to continue working was the age of the respondent, with 90 percent of younger workers (i.e., 21 to 34 years of age) expressing a preference to continue working in the hypothetical instance of sudden wealth versus 61 percent of older workers (i.e., 55 to 64 years of age). Another important covariate was the amount of training required for an occupation (86 percent of professionals would continue to work versus 58 percent of unskilled laborers).

It has been many years since the Morse and Weiss data were collected. In the interim, Euro-American culture has perhaps undergone some fundamental changes in the value it places on work. Cultural-change theorists (Boguslaw, 1965; Hodgkinson, 1967; Kluckhohn, 1958; McClelland, 1971; Riesman, 1950; Whyte, 1956) have argued that since the middle of this century a steady decline has occurred in the value attached to work. Although these writers contend that the decline is due to changes in different constructs (e.g., need for achievement, Protestant work ethic, other-directedness), the consensus is that the value of work (perhaps even the desire to work) has been depreciating. The correctness of this viewpoint is supported by the fact that the present author was unable to find a single organizational theorist who professes the reverse process (i.e., increases in need for achievement, or improvement of workers' attitudes toward work in general).

If the decade of the seventies is truly an era of narcissism and self-indulgence (as it has been popularly characterized), it can be hypothesized that the findings of Morse and Weiss would not be replicated with a national sample of working males. On the other hand, a replication of the findings of Morse and Weiss would argue against the alarmist positions taken by contemporary theorists.

The intent of the present study was (1) to recalibrate the degree to which workers will desire to continue working if working were no longer necessary for self-support; (2) to compare the present-day results with the mid-fifties findings of Morse and Weiss in order to identify similarities and differences over time; and (3) to draw inferences regarding the validity of the prognosis of culture-change theorists.

Method

Currently employed, full-time male workers were interviewed in their homes by trained interviewers as part of the General Social Surveys. The surveys, sponsored by the National Opinion Research Center, were conducted during 1974, 1976, and 1977. A quota-sampling scheme, based on U.S. Census tract information, was employed in the collection of the interview data. In total, 1,099 males were surveyed. The demographic characteristics of those surveyed therefore may be judged as representative of the full-time, adult male labor force. Several important demographic characteristics of the sample are race, 92 percent white, 8 percent black; mean age, 40.04 years; and mean education, 12.75 years. During the course of the interview each respondent was asked the following question: "If you were to get enough money to live as comfortably as you would like for the rest of your life, would you continue to work or would you stop working?" Responses were coded 1 for continue working and 2 for stop working. The wording of this question is superior to the wording of the question asked by Morse and Weiss in that the Morse and Weiss question proposed something which, to many people, would be an extremely unlikely and difficult-to-imagine situation (i.e., a sizable inheritance). The present wording leaves open the issue of the source of sudden wealth so as not to distract the respondent from the critical question (i.e., their response to an opportunity to quit working without concomitant economic hardship). Each respondent was also asked: "On the whole, how satisfied are you with the work you do—would you say you are very satisfied (coded 1), moderately satisfied (coded 2), a little satisfied (coded 3), or very dissatisfied (coded 4)?"

In addition to demographic and other attitudinal data, each subject provided a description of his job duties and job title. This description enabled the classification of each respondent's job on a measure of occupational prestige—that is, the Hodge-Siegel-Rossi Scale (Siegel, 1971).

Results

Of the 1,099 men surveyed, 794 (72.2 percent) indicated that they would continue to work and 305 (27.8 percent) indicated that they would stop working if they became wealthy. These obtained proportions are significantly different (Fleiss, 1973) from the expected proportions (.80 and .20, respectively) derived from the Morse and Weiss study (Z diff. $= 6.28$, $p < .001$). Because the data were gathered over a period of four years, the proportions of workers who would continue to work were examined for changes over time. A significant change over time in these proportions was not observed ($X^2 = 3.76$, $df = 2$, $p > .10$).

A breakdown of the data by age and desire to continue working is presented in Table 1. A comparison of the cell-frequencies of the present data set with the expected cell-frequencies from the same breakdown reported by Morse and Weiss resulted in a set of significant differences (see Table 1). With the exception of the 45 to 54 year-old category, these significant differences were in the direction of the current sample expressing a stronger preference to discontinue working relative to the Morse and Weiss sample. (It would be incorrect to compare the entire matrix of proportions for the two samples because the age distribution of the 1950s sample is quite different from the age distribution of the 1970s sample. Therefore, within-age category comparisons were conducted between the two samples.)

TABLE 1

Cross-Tabulation of Desire to Work and Age

		NORC Data (1974, 1976, 1977)		*Morse and Weiss Data (1953)*			
				Expected Percentages			
Age Category	*N*	*Percentage who would continue to work*	*Percentage who would not wish to continue to work*	*Continue to work*	*Stop working*	*Z*	*p*
21-34	425	78.4	21.6	90	10	8.00	.001
35-44	246	76.8	23.2	83	17	2.58	.01
45-54	244	70.1	29.9	72	28	<1	
55-64	157	54.8	45.2	61	39	2.16	.05
65 or over	27	55.6	44.4	82	18	3.58	.01
Total responding	1,099	72.2	27.8	80	20	6.28	.001

Morse and Weiss also reported a relationship between occupational standing and desire to continue working. This relationship was tested in the present data set by correlating occupational prestige and desire to continue working. A significant, albeit weak, correlation between these two indices replicated the relationships reported by Morse and Weiss ($r = -.080$, $p < .001$).

The percentages of workers desiring to continue-discontinue working was cross-tabulated with expressed job satisfaction for the current sample. This cross-tabulation yielded a significant chi-square ($X^2 = 17.41$, $df = 3$, $p < .0001$) and suggested that dissatisfaction is related positively to desire to discontinue working.

Following a random partitioning of the data set into two samples, two multiple discriminant analyses (Tatsuoka, 1971) were performed for the dependent variable of desire to continue working. The random partitioning of the data set enabled a check on the stability of the results of the analyses. The set of independent variables, selected because of their previously demonstrated importance in the area of worker values, included respondent's age, education in years, race (coded 1 = white, 2 = black), income, global job satisfaction, occupational prestige, and size of community of residence in thousands of persons per municipality. A single, significant discriminant function emerged from each discriminant analysis. Table 2 displays the associated standardized discriminant function coefficients for the predictor variables. From the relative magnitudes and signs of the obtained standardized function coefficients, it is evident that the strongest and most consistent discriminators are the variables of respondent age and job satisfaction.

TABLE 2
Results of Discriminant Analyses
(Dependent Variable = Desire to Continue Working)

	Canonical Correlation	*Wilks's Lambda*	X^2	*df*	*p*
Sample A ($n=565$)	.300	.910	49.921	7	.000
Sample B ($n=534$)	.211	.956	25.483	7	.001

	Standardized Coefficients	
Variable	Sample A	Sample B
Age	−.554	−.879
Education	.416	.136
Income	−.320	.029
Prestige	.226	.038
Race	.004	−.389
Satisfaction	−.506	−.423
Urban/rural	−.252	−.074

Double cross-validation (Mosier, 1951; Norman, 1965) was conducted by applying the discriminant weights obtained from the first random sample of the data set (sample A) to the remainder of the data set (sample B), and vice versa. The resulting weighted criterion values then were correlated with the actual criterion values within each of the random samples. These correlations, which resulted after applying sample A's weights to sample B's data and applying sample B's weights to sample A's data, were .17 ($p < .001$) and .25 ($p < .001$), respectively. The average of these correlations (following Fisher's r-to-z transformation) was .21. This average correlation provides a more realistic estimate of the predictive efficiency of the discriminant analysis approach. From the weak magnitude of this "shrunken" relationship, it must be concluded that individual preference to continue-discontinue working cannot be easily predicted from demographic information.

Discussion

The present findings underscore significant differences in the predispositions of the labor force of the mid-1970s relative to the labor force of the 1950s. There are several alternative explanations for the observed differences. First, it is possible that the aforementioned change in the wording of the desire-to-work question may have encouraged the more recent sample to say they prefer to stop working, although it is difficult to explain how such a bias might operate. If, indeed, a degree of bias were involved as a consequence of item format, the bias argues against the drawing of conclusions from the Morse and Weiss data in that the NORC question is a superior wording of the intended question. Therefore, if any conclusions are drawn about the predisposition of the U.S. labor force "to discontinue working if it were at all possible," such conclusions are more accurately based on the NORC data than on the Morse and Weiss data.

An alternative explanation of the current findings is in terms of differences in samples and procedures. However, both the NORC data of the present study and the Morse and Weiss data were gathered via multistage area probability sampling schemes. Close inspection of the procedures surrounding both data sets argues for their representativeness of the non-institutionalized U.S. population. (For more details on the Survey Research Center data analyzed by Morse and Weiss, see Kish [1953] and Cannell and Kahn [1953]. For details on the NORC data, see Davis [1977].)

Excluding these two possibilities (i.e., question format and sampling procedures), one is left with the conclusion that an attitudinal shift in the male labor force has occurred over an approximate 20-year period. The shift is best summarized as a 39 percent increase in the number of male workers who would stop working if given the opportunity. Perhaps these results reflect an increase in the social acceptability of openly endorsing early retirement and self-indulgence. Or perhaps, as suggested by several organizational theorists, there has been and continues to be a real decline in the perceived value and meaning of work in our culture. Workers' informal expressions of growing concern with leisure activities and the growth of the recreational industries further attest to a movement towards greater interest in the quality of one's leisure-life versus the quality of one's work. The present conclusions have particular relevance for theories of cultural change (e.g., Sorokin, 1941) that argue that cultural values shift over time toward greater advocation of self-indulgence.

In summary, the present findings suggest that a leisure ethic may be replacing the traditional work ethic in the United States. This point is in accordance with the general prognosis of cultural change theorists. Although it may be argued (on a positive note) that the majority of workers (72.2 percent) would desire to continue working, cross-cultural studies employing the same methodology as the current study may provide interesting insights as to the relative standing of the U.S. labor force vis-a-vis the rest of the world.

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A STUDY ON THE LEADERSHIP BELIEFS OF ISRAELI MANAGERS[1]

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The discrepancy between favorable beliefs toward participative practices and a disbelief in the leadership capabilities of other individuals has been widely recognized to be an important, albeit controversial, finding in comparative research on managers (Ajiferuke & Boddewyn, 1970; Argyris, 1967; Barrett & Bass, 1976; Roberts, 1970; Schuh, 1974). In surveying over 3,000 managers in 14 countries, Haire, Ghiselli, and Porter

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(1966) discovered that managers, with consistency across cultural lines, tended to favor sharing information, delegating responsibilities, and setting goals with their subordinates. Yet, these same managers had a rather low appreciation of the capacity and willingness of individuals to take an active role in the management process. That study covered managers in five clusters of countries that run the continuum of cultural-economic development: Anglo-American, Nordic-European, Japan, Latin-European, and developing countries. The universality of these conflicting beliefs has been supported in later replication studies among 1,339 Australian (Clark & McCabe, 1970), and 42 Greek (Cummings & Schmidt, 1972) managers. The present study continues this line of research with a critical replication.

In Israel, there are strong traditions of democratic and cooperative ideologies coupled with informal participative leadership styles (Eisenstadt, 1967; Weinshall, 1976). Nevertheless, the absorption of mass immigration, the maintenance of external security, and the country's economic and industrial growth were effectuated through large public and private bureaucracies which soon developed highly centralized patterns of administrative control (Tannenbaum, Kavcic, Rosner, Vianello, & Weisser, 1974; Weinshall, 1976). Such contradictory forces are expected to have an impact on shaping both general managerial values and immediate role behaviors. *It was hypothesized,* therefore, *that Israeli managers experience a belief-conflict similar to that found in previous research: autocratic beliefs toward leadership capacity of others together with a democratic participative approach toward the management style.*

Following Clark and McCabe (1970), the second objective was to test the consistency between managers' general leadership beliefs and (a) the perceived practicality of these beliefs and (b) the reported actual behaviors relative to these beliefs. *It was hypothesized that,* in accordance with their findings, *Israeli managers favor methods of participative management in principle, but doubt their actual usefulness concomitantly.*

The third research objective was to explore the extent to which leadership beliefs were related to certain organizational characteristics. Specifically, *it was hypothesized that managers in labor-owned plants would express more democratic leadership beliefs than would their colleagues in both state and privately owned industry.* This would occur because of the relatively strong participative management ethos characterizing the organizational environment in the Histadrut (the Israeli General Federation of Labor) sector (see Derber, 1973; Rosenstein, 1970). The importance of this sector stems not only from its large size but also from its unique dual role as both a labor union and an employer.

Similar in concept to the American AFL-CIO, the Histadrut is the umbrella federation of most Israeli labor organizations and unions. Eighty-five percent of the wage earners are members, have a right to vote, pay dues, and enjoy family health care and insurance automatically. In addition, each member holds one share in Hevrat-Haovdim (the General Cooperative Association), which is the economic branch of the Histadrut and counterpart of the Trade Union Department. An offspring of early labor movement ideology pertaining to self-sufficiency of the working class, Hevrat-Haovdim presently accounts for over 20 percent of both the Domestic Net Product and the total work force. Its economically competitive companies and conglomerates include key enterprises in industry, agriculture, transportation, finance, and social services. The Histadrut, as a labor organization, plays a decisive role in the country's industrial relations systems, nationally as partner to the government and the Manufacturers' Association, and locally through workers councils and collective bargaining. Thus, many Israeli employees are in the unique position of being employed, managed, and represented by the same organization, part of which they themselves might own.

Sample

Forty-seven manufacturing organizations were randomly selected from a list of companies with more than 250 employees obtained from the Israeli Central Bureau of Statistics. The mean size of the plants was 664 (*S.D.* =449) employees. Two thirds belonged to the private sector, 21 percent were Histadrut owned, and the remaining were owned by the government. The selected plants also were representative of a wide range of industries.

A total of 646 top and middle level line and staff managers received the questionnaires directly in their offices. Of the contacted managers, 371 (57 percent) responded. Their average age was 46 years, average plant tenure was 8.2 years, and the mean years of schooling was 14.3.

Measures

Leadership beliefs were measured by Clark and McCabe's (1970) extended version of the original questionnaire employed by Haire et al. (1966). This scale contains eight statements purportedly tapping beliefs in democratic and autocratic leadership styles. Two statements, randomly ordered, assessed each of the following factors: (a) individuals' capacity for assuming leadership roles; (b) sharing information with subordinates; (c) participation of the work group in goals setting; and (d) reliance on intrinsic behavior control. For instance, category A was measured by the following items: "The average individual prefers to be directed, wishes to avoid responsibility and has little ambition," and "Leadership skills can be acquired by most people regardless of their inborn traits and abilities." Participation (category B) was assessed by these items: "The leader's influence is lessened if his subordinates cannot influence him," and "Group goal setting offers advantages that cannot be obtained by individual goal setting."

For each statement the respondents were asked to indicate, on a 5-point Likert type scale, the extent to which they (a) believe in it (general belief),

(b) perceive it to have a practical value (practicality), and (c) actually behave in accordance to it (actuality).

Procedure

Following suggestions of Barrett and Bass (1976) on cross-cultural replications, the questionnaire was translated to Hebrew and back to English. Subsequently, discrepancies were corrected and wording clarified. Finally, in order to adjust to specific semantic and cultural differences, the retranslated instrument was pilot-tested and improved through interviews with 15 managers.

The field survey itself consisted of three phases: (1) Interviews were held with chief executives, and organizational charts were obtained; (2) Participating managers (excluding first line supervisors) were sent questionnaire packages through the plants' mail systems; and (3) Follow-up efforts included telephone calls, reminder letters, and a second wave of questionnaires. Data collection from all participating companies was completed in 1974 and processing and analysis in 1976.

Results

The first hypothesis stated that there is a significant gap between managers' attitudes toward others and their attitudes toward some management methods. Specifically, it was expected that the scores for category A (capacity for leadership) would be significantly lower (more autocratic) than those for categories B (sharing information), C (group goal setting), and D (internal control). As seen in Table 1 the hypothesis is strongly supported. The mean score for category A is significantly different from each of the other categories. This finding is consistent with Clark and McCabe (1970) and Cummings and Schmidt (1972).

TABLE 1
Leadership Beliefs Among Israeli Managers[a, b]
($N = 371$)

Attitude Category	*Mean*	*Standard Deviation*	*t-Values* A	B	C	D
A. Capacity for leadership and initiative	2.65	.84	—	8.86*	16.36*	17.29*
B. Sharing information and objectives	3.28	1.02	—	—	5.49*	6.29*
C. Participation	3.65	.82	—	—	—	.69
D. Internal control	3.70	.91	—	—	—	—

[a] The higher the score, the more democratic the attitude.

[b] For cross-national comparison see Haire et al. (1966); Clark and McCabe (1970), and Cummings and Schmidt (1972).

*$p < .001$, two-tailed test

TABLE 2
General Belief, Practicality, and Actuality Mean Scores and t-Values

Frame of Reference	*Overall Score*[a]	*General Belief*	*Practicality*	*Actuality*
General belief	26.61	—	2.34*	5.73**
Practicality	26.19	—	—	9.28**
Actuality	27.83	—	—	—

[a]Mean summary score for eight items.
*$p < .05$, two-tailed test
**$p < .001$, two-tailed test

It was expected further that Israeli managers would report inconsistence in relation to their general beief in a given managerial principle, its practicability for them, and its actual application on the job. In order to test this hypothesis, overall means were computed for each of the three frames of reference. Totals then were obtained by summarizing the eight item scores separately for general belief, practicality, and actuality. Replicating the test performed on similar data by Clark and McCabe (1970), the present results support the inconsistency hypothesis. Israeli managers assigned higher scores to actuality (reported job behavior) than to practicality and general belief (Table 2).

Finally, it was expected that Histadrut managers would be more democratically oriented than would managers in other sectors. However, managers of the Histadrut-owned plants exhibited the least democratic ideology (25.93). Managers in the state-owned and those in the private industry were significantly more democratic (27.42 and 26.48, respectively). Overall, these differences, although small, are significant in a one-way analysis of variance test (Scheffe, 1953). No similar differences existed among the sectors in regard to the practicality and actuality frames of reference (See Table 3).

Discussion

In the now-classic distinction between autocratic ("Theory X") and democratic ("Theory Y") leadership styles (Likert, 1967; McGregor,

TABLE 3
Attitudes of Israeli Managers Toward Democratic Management Style in Three Different Sectors

Frame of Reference	*Government Owned (n=67)*	*Private Owned (n=220)*	*Histadrut (Labor Owned) (n=84)*	*Overall F*
General belief	27.42	26.48	25.93	4.544*
Practicality	26.30	26.14	25.87	N.S.
Actuality	28.10	27.91	27.89	N.S.

*$p < .05$

1960), an autocratic leader would tend to believe, inter alia, that his or her subordinates need explicit and detailed direction, that only task related information should be transmitted to them, and that their performance can be controlled primarily by extrinsic rewards and sanctions. A democratic manager, on the other hand, would delegate responsibility, consult with and be influenced by subordinates continuously, and, above all, would motivate them through intrinsic rewards. These approaches imply, of course, that effectiveness of either style would seem to require some consistency among implicit assumptions, attitudes, and behaviors. The present study was designed to address, to some extent, this assertion.

In agreement with the first hypothesis, Israeli managers in manufacturing responded very favorably to the items on participative management beliefs but not favorably to items on the capabilities of other individuals. Consequently, it appears that the Haire et al. (1966) belief-conflict phenomenon has gained additional empirical support.

Contrary to the second expectation, Israeli managers perceived themselves as actually behaving in a democratically oriented manner on the job (that is, they reported they share information, provide for two-way channels of influence and communication, train subordinates to become responsible leaders, and do not rely on external factors to control and motivate employees). However, they were significantly less supportive of participative methods from an ideological point of view, and they questioned the practical value of these methods. Although overall inconsistencies were found among the three frames of reference, the findings differ from those of Clark and McCabe (1970). Among Australian managers, general belief was significantly more democratic than were the actuality and practicality frames of reference. This might reflect cultural differences between the two groups and indicate that on their jobs Israeli managers tend generally to practice participation more so than do their Australian counterparts. This conclusion, however, awaits empirical support.

The third expectation, regarding the significantly stronger approval of participative management practices by Histadrut sector managers relative to their private and state sectors counterparts, surprisingly was disconfirmed. It could be that Histadrut managers, exposed as they have been to several past attempts by the Histadrut leadership to introduce workers' participation in management schemes into its plants, have become disillusioned about the desirability of participative management. For some corroborative evidence, see Derber (1973) and Rosenstein (1970). Undoubtedly further cross-sectorial research should be done to confirm the contention here that managerial behavior is related to the type of organizational ownership.

Findings of the present study should be evaluated with caution. First, although the leadership beliefs questionnaire has been used extensively, its reliability remains to be established. Indeed, the limited number of items (8) and their somewhat ambiguous structure already have been criticized (Ajiferuke & Boddewyn, 1970). Second, in the previous studies the questions measuring belief in the leadership capacity of people were worded in terms of the average individual. Clark and Wotherspoon (1973) found that when these questions were asked in terms of subordinates, part of the discrepancy disappeared. They, therefore, suggested that part of the gap was artifactual. However, even with this change the replicated gap was significant. In the present study no such amendment of the original questionnaire was done, and thus the finding could be partially a methodological artifact consistent with previous research.

Third, although managerial behavior is referred to in several instances, the self-report measurement in the present study did not go beyond tapping cognitions and behavioral intentions. Therefore, any conclusion concerning actual behavior patterns would be immature. Indeed, future research could directly test the extent to which there is a congruence between managers' perceptions of their own managing style and (a) perceptions of role-set members of this behavior, and (b) indices of observed actual role behaviors.

Fourth, the usage of this job-related questionnaire alone without a supplementary measure of specific cultural attributes (Roberts, 1970; Schuh, 1974), limits the ability to make comparisons with managers from other countries. Schuh (1974), for example, constructed a "basic cultural differences scale" which, when correlated with the Haire et al. (1966) items, produced better consistency for two cultural groups. Certainly, with the growing interest in and need of cross-cultural research of managerial behavior (Barrett & Bass, 1976; Connor & Becker, 1975; Whitley & England, 1977), such methodological improvements are welcome. However, the question of the meaning and implications of the belief-conflict still must be addressed.

Why do managers endorse democratic-participative management practices when in fact they do not believe in other people's readiness for initiative, responsibility, and leadership? A possible explanation is that managers have come to realize that some participative practices that do not imply power-sharing, such as passing information or minimally involving subordinates in the decision making process, may promote subordinates' acceptance of and compliance with their decisions and policies.

An alternative interpretation can be made through attribution theory. Managers who daily have to cope with immediate role pressures could develop a tendency to blame others (for instance, subordinates) for creating these troubles but attribute to themselves success-related application of socially desirable methods such as participative management. Such a hypothesis, again, could be investigated in future research.

Finally, perhaps the inherently negative approach to the possible existence of the belief conflict among managers should be reconsidered. Although some managerial models such as those by Likert (1967) do abhor inconsistency, it could be that such a "cognitive dissonance" does not necessarily endanger managerial effectiveness but may serve rather to facilitate and maintain it in the face of conflicting job demands.

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Impact of the Organization Environment on the Long-Range Planning Process: A Contingency View[1]

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A two-stage survey of 199 corporations in 15 industrial classifications found that firms tend to adopt more complete formal long-range planning processes as the complexity and instability of the business environment increases. These findings were moderated by including the size of the firm as an intervening variable. Other hypotheses dealing with the environment and long-range planning were tested with mixed results.

The environment in which the long-range planning process takes place may have an important effect on how the process is conducted. Empirical studies by Henry (1967), Litschert (1968, 1971), and Rue (1973) have indicated that different industries and firms within industries place varying emphasis on long-range planning. Results of these investigations seem to lend support to the contingency approach, which has become increasingly more popular in management literature in recent years. Contingency theory has been seen as having the potential for bringing about an integration of earlier classical and behavioral theories of management in order to blaze a pathway out of the "management theory jungle" (Luthans, 1973). Contingency approaches have been proposed for organization design (Woodward, 1965; Lawrence & Lorsch, 1967), individual behavior (Skinner, 1969), leadership (Fiedler, 1967), business strategy (Hofer, 1975), and planning (McCaskey, 1974). The latter two studies raised some interesting conceptual issues but failed to test empirically the planning theory that was proposed. In an extensive review of the "organization-environment relations" literature published between 1965 and 1974, Darran, Miles, and Snow (1975) found only nine empirical studies that related aspects of planning and control to environmental factors. Only one of these (Litschert, 1968) investigated the long-range planning relationship with the environment. In summary, a significant amount of theoretical development has been done in the areas of contingency and strategic planning, but much remains to be done in empirically testing the propositions developed by those theorists.

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[1] This research was financed, in part, by a grant from the Planning Executives Institute, Oxford, Ohio. An earlier version of this paper was presented at the 1978 National Academy of Management meeting in San Francisco.

The purpose of the present research was to examine empirically the relationship between organizational environments and the completeness of the long-range planning process within a reasonably large number of predominantly U.S. firms. Specifically, the study was designed to:

1. Test hypotheses based on propositions drawn from existing contingency theory to determine the relationship of organizational environments as measured by the complexity and stability of the environment with differences in completeness of the long-range planning processes.
2. Suggest managerial implications of these interactions and explore the possibility of extension to other organizational-environmental interactions.

There is little doubt that different organizations employ the process of long-range planning to varying degrees of completeness. Ackoff (1970), Ansoff (1965), Drucker (1970), and Steiner (1969) have outlined certain requirements for the long-range planning process. These authorities suggest that a complete long-range plan should:

1. be applicable to most, if not all, segments of the business.
2. contain objectives or goals.
3. contain the methods, procedures, and means for realizing and implementing the goals and objectives.
4. contain some procedures for auditing and controlling the plan.

Based on the above normative requirements of planning, three ordinal classes of planning completeness were identified. It was realized that planning completeness is actually a continuum ranging from no planning to a very sophisticated process. The classes thus were selected to represent both extremes and the approximate midpoint of the long-range planning continuum. Those firms with plans in Class 1 do basically no formal long-range planning, those with plans in Class 2 do engage in some long-range planning, and those with plans in Class 3 have a reasonably sophisticated long-range planning process.

Various authors have implied that the business environment is composed of physical, cultural, and technological components (Homans, 1950) and that the organizational environment can be broken down into its internal and external environment (Duncan, 1972). The multifaceted nature of constituent groups in the external organizational environment has been presumed by a number of writers (Dill, 1958; Estafen, 1971) to include: competitors, suppliers, consumers, stockholders, governments, regulatory agencies, and labor markets. The internal environment is viewed as consisting of all the relevant physical and nominal factors within the boundaries of the organization that influence the decision making behavior of individuals in the organization (Duncan, 1972). The dynamic nature of the business environment has been a topic of considerable interest (Terreberry, 1968; Emery & Trist, 1965). Recent efforts to summarize the scope of the environment through the use of the systems approach (Seiler, 1967) and to measure the extent of environmental change (Lawrence & Lorsch, 1967; Duncan, 1972) provide the framework for this research.

Duncan (1972) identified two key environmental dimensions, simple-complex and static-dynamic, from earlier work by Emery and Trist (1965), Thompson (1967), and Terreberry (1968). The same two dimensions were used in the present study to provide a measure of organizational environment. The simple-complex dimension is viewed as dealing "with the degree to which the factors in the decision unit's environment are few in number and are similar to one another in that they are located in a few components" (Duncan, 1972, p. 315). Duncan measured this dimension by looking at the number of factors taken into consideration in the decision making process. Duncan conceived of the static-dynamic dimension as the extent to which factors in the decision unit's environment remain stable over time. Duncan basically measured this dimension by examining the variability of old factors and the frequency of introduction of new factors used in the decision making process.

METHOD

Sample

The initial sample for this study consisted of 390 firms in the United States and Canada (3 percent of the total) in a wide variety of durable, nondurable, and service industries. These 390 firms represented the respondents to an earlier study by one of the authors (Rue, 1973). This earlier research effort, which focused on those firms included on Standard and Poor's Compustat tapes, produced responses that were used to classify the completeness of the long-range planning process used within these firms. The most recent questionnaire mailed to these same firms brought 198 usable responses (50.7 percent). This questionnaire provided data for classifying the firms according to their perceived organizational environment. Data were gathered from chief executives or senior corporate planning officers of the responding organizations. Various characteristics such as average size, industry, and financial characteristics of the respondents and nonrespondents were compared to detect any biases in both samples. No significant biases were discovered.

Questionnaires

To measure completeness of the planning process the planning questionnaire summarized in Table 1 was developed incorporating the normative requirements for effective planning listed earlier (Rue, 1973). Respondents to this questionnaire were asked to specify the existence and extent of use of various factors in their long-range planning process by choosing appropriate responses from among those provided for each of 14 closed-ended questions. The questions were designed to be specific so that a firm's long-range planning process could be categorized objectively into one of the three planning classes described as follows:

Class 1. No formal long-range planning process.

Class 2. Written, documented plan which includes the specification of objectives and goals, the selection of objectives and goals, the selection of long-range strategies, and a determination of the future resources required (pro forma financial statements and other quantitative projections).

Class 3. Plan contains all of the items in Class 2 plus procedures for anticipating or detecting errors in, or failures of, the plan and for preventing or correcting them on a continuing basis, plus some attempt to account for factors outside the immediate environment of the firm.

TABLE 1
Summary of Planning Questionnaire

1. Does your company prepare a written long-range plan covering at least three years?
   a. If so, what time period does it cover?
   b. How long has your company prepared a long-range plan (years)?
2. Who is responsible for the long-range planning of your firm (corporate level)?
3. Your long-range plan includes quantified objectives for which of the following (financial criteria such as earnings, ROI, etc.)?
4. Does your firm employ, on a regular basis, the use of a mathematical model or the computer in any phase of your long-range planning process?
5. Does your long-range plan include one or more pro-forma financial statements?
6. Your long-range plan includes plans and budgets for which of the following (human resources, product development, corporate expansion, etc.)?
7. Does your firm employ the use of outside consultants to assist in the long-range planning process? If so, what is the primary source of consultants?
8. Does your long-range planning process emphasize:
   a. upward flow of information
   b. downward flow of information
9. Is information contained in your long-range plan:
   a. available only to management
   b. available to the public
10. Your long-range plan attempts to specifically identify which of the following factors (social, economic, and political trends and attitude changes)?
11. Does your long-range plan contain procedures for anticipating or detecting differences between your plan and actual performance and for preventing or correcting these differences? If yes, how frequently is this done?
12. How long has the chief operating officer of your company held his current position?
13. Does your firm prepare formal monthly, short-range budgets including performance reviews for each cost or profit center in the firm?
14. How long has the company been in existence?

TABLE 2
Multiple Cutoff System Used to Classify Completeness of the Long-Range Planning Process

Class 1. Firm has no written long-range plan covering at least 3 years into the future (Question #1):
Class 2. Firm has a written long-range plan covering at least 3 years into the future (Question #1)
plus
Plan includes the specification of objectives and goals (Question #3)
plus
Plan includes the selection of long-range strategies (Question #6)
plus
Plan includes the determination of the future resources required (Question #5)
Class 3. All of the requirements for Class 2
plus
Procedures for anticipating or detecting error in, or failures of, the plan and for preventing or correcting them on a continuing basis (Question #11)
plus
Some attempt to account for factors outside of the immediate environment of the firm (Question #10).

The multiple cutoff system outlined in Table 2 was used to classify a firm's long-range planning process. Under this system a firm was placed into the next lower class if any of the requirements for a certain class were not met. These classifications were used to perform initial statistical tests on the data in contingency tables.

A more complicated procedure was developed to measure the environment. Drawing on Duncan's (1972) and Harvey's (1968) work, an environmental questionnaire was developed to measure three dimensions of the business environment. These were complexity and stability, discussed earlier, and product volatility. Using a method similar to that of Duncan, the dimension of complexity was measured by asking the respondents to indicate on a 4-point scale ("never" to "frequently") the relative frequency with which each of 25 items had been considered in long-range planning decisions made in the past year.

To measure the stability dimension, those factors that had been identified by the respondents as being "frequently" considered in the most recent planning period were tested for importance in several earlier periods to yield a single measure of environmental stability (Lindsay, 1975). This was accomplished by having the respondents check, from several choices, those earlier periods in which the respective factor had also been considered important. Thus, the environment was classified as stable to the extent that the same factors had remained important over the last several planning periods. Median splits were used for classifying an organization's environment as high/low in complexity and high/low in stability in order to perform initial statistical tests on contingency tables. For example, if an organization had a high complexity score that was above the median level of complexity for all firms but had a low stability score such that it was below the median for all firms, it would be put into environmental Class 2. The scoring method for the questionnaire is given as Table 3.

TABLE 3
Scoring Method[a, b]

A. Simple-Complex Continuum (Question 1 and Frequency of Consideration Column)

(1) Long-range planners were asked to check items in the frequency of consideration column which had been included in their recent long-range planning decisions, in order to gain a measurement of complexity of the environments within which the planners make decisions.

(2) A separate score was calculated for the internal and external environments and added together for a total score.

(3) To obtain scores for the simple-complex scale, the total number of items checked as *3* ("frequently considered") in the frequency of consideration column were tallied and multiplied by the square of number of *different* factor categories in which those items appeared. Duncan defended the squaring of the number of factors on the basis that it weights the variability factor between categories more highly than the variability within the same categories.

Thus: Complexity $(C) = (\Sigma I) \times (\Sigma F_3)^2$

I = items checked, from 1 to 25
F = number of *different* factor categories such as personnel or technology in which at least one item has been checked as a *3* (frequently considered).

Example 1: If a respondent checked a *3* in the frequency of consideration column for items 1, 4, 5, and 7 in the external environment section and items 15, 18, 23, and 25 in the internal environment section, he would be scored as follows:

Environmental Complexity	Items		(Categories)^2		Score
External	4	×	$(3)^2$	=	36
Internal	4	×	$(2)^2$	=	16
Total					52

B. Stable-Unstable Continuum (Question 2 and both columns)

(1) Long-range planners were asked to check the number of years, within the last three, in which "frequently considered" factors had been perceived as being of primary importance as a measure of the stability of the organizational environments within which decisions must be made.

(2) A separate score again was calculated for internal, external, and total environmental stability.

(3) To obtain scores for the stable-unstable scale a weighted average of the "frequency of consideration" values was added to a weighted average of the "consistency of importance" column.

$$\text{Thus: Stability } (S) = \frac{\Sigma w_f \times I_f}{6} + \frac{\Sigma w_i \times I_i}{10}$$

w_f = item weights for items checked in the frequency of consideration column on the questionnaire
I_f = items checked, from 1 to 25, in the frequency of consideration column on the questionnaire
w_i = item weights for items checked in the consistency of importance column on the questionnaire
I_i = items checked from 1 to 25, in the consistency of importance column on the questionnaire.

Example 2: Suppose that a respondent had checked items as follows on his questionnaire:

Environment Responses	Frequency of Consideration				Consistency of Importance			
	3	2	1	0	4	3	2	1
External	8	2	3	0	2	3	2	1
Internal	5	4	2	1	3	1	1	0
Totals	13	6	5	1	5	4	3	1

---

[a] Missing values were replaced with the mean value of the missing variable.
[b] A copy of the questionnaires may be obtained from the authors.

TABLE 3 (cont.)
Scoring Method[a, b]

To score his response, the following calculations would be made:

External Environmental Stability

$$\frac{3(8)+2(2)+1(3)+0(0)}{6}+\frac{4(2)+3(3)+2(3)+1(1)}{10}=7.6$$

Internal Environmental Stability

$$\frac{3(5)+2(4)+1(2)+0(1)}{6}+\frac{4(3)+3(1)+2(1)+1(0)}{10}=6.0$$

Total Environmental Stability = 13.6

Responses were categorized into four classes for internal, external, and total environmental "turbulance" using median splits for organizations to be classified as high/low complexity and high/low stability such that:
Class 1—Simple-stable
Class 2—Complex-stable
Class 3—Simple-unstable
Class 4—Complex-unstable
For example, if an organization had a high complexity score which was above the median level of complexity for all firms, but it had a low stability score such that it was below the median for all firms, it would be put into Class 2. Thus, the lower the complexity score, the simpler the environment. The lower the score, the more stable the environment, the higher the score, the more unstable the environment.

C. Classification of Variables Used to Test Hypotheses

Variable	Data Source and Coding Method	Hypotheses Test(s)
External Turbulence Internal Turbulence Total Turbulence	L.R. Planning Environment Questionnaire Classes: (1) Simple-Stable (2) Complex-Stable (3) Simple-Unstable (4) Complex-Unstable	1 & 2
Planning Completeness	L.R. Planning Questionnaire, Q. 1, 3, 5, 6, 10, 11 Scoring: 1 point for every positive response Index = sum of points Range of scores: 0 to 6 Classes: (1) Impoverished (2) Programmed (3) Progressive	1
Uncertainty Reducing Methods	Planning Questionnaire, Q. 4 and 7 Scoring: 1 point for "Yes," 0 for "No" Index = sum of points Range of scores: 0 to 2 Classes: (1) Never use (2) Sometimes use (3) Frequently use	2a
Open Systems Approaches	Planning Questionnaire, Q. 2, 8, 9 *Scoring* Question 2: Individual divisions —6 points Planning dept. and divisions —5 points Other —4 points Planning dept. —3 points Planning dept. and top management —2 points Top management —1 point	2b

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[a] Missing values were replaced with the mean value of the missing variable.
[b] A copy of the questionnaires may be obtained from the authors.

TABLE 3 (cont.)
Scoring Method[a, b]

Variable	Data Source and Coding Method	Hypotheses Test(s)
	Question 8: Information flowing both ways —3 points Information flowing upward —2 points Information flowing downward —1 point Question 9: Available to public —2 points Available only to management —1 point Index = sum of points Range of scores: 1 to 11 Classes: 1-4 points, relatively closed 5-7 points, intermediate 8-11 points, relatively open	
Years of Existence	Planning Questionnaire, Q. 1, Section 3 Uses same categories as questionnaire Classes: (1) 0-2 years (2) 3-5 years (3) over 5 years	2c
Planning Horizon	Planning Questionnaire, Q. 1, Section 2 Uses same categories as questionnaire Classes: (1) 3-5 years (2) 6-10 years (3) over 10 years	2d
Review	Planning Questionnaire, Q. 11, Section 2 Uses same categories as questionnaire Classes: (1) Weekly or less (2) Monthly (3) Quarterly (4) Semiannually (5) Annually (6) Every 1-3 years	2e
Immediacy of Goals	Planning Questionnaire, Q. 3, 6, and 10 Scoring: 1 point each for quantified objectives of sales, earnings, and ROI in Question 3; products, plant expansion, and equipment acquisitions in Question 6; population trends and personal incomes in Question 10 for "tangible goals." 1 point each for quantified objectives of capital growth, share of market in Question 3; hiring and training of key management personnel, corporate acquisitions, and research and development in Question 6; and social currents, technological breakthroughs, and labor/personnel attitudes for "intangible goals." Index = sum of points Range of scores: 1-8 points, on each variable Tangible Goals Classes: 1-2 points, longer range, few tangibles addressed 3-4 points, intermediate range 5-6 points, short range 7-9 points, immediate, many tangibles addressed Intangible Goals Classes: 1-2 points, few intangibles addressed 3-4 points, some intangibles addressed 5-6 points, several intangibles addressed 7-8 points, maximum intangibles addressed	2f

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[a] Missing values were replaced with the mean value of the missing variable.

[b] A copy of the questionnaires may be obtained from the authors.

Finally, to develop an objective criterion against which to check these measures of organizational environment, respondents were asked to indicate the number of major product changes and introductions that had taken place during the last three years. Harvey's (1968) definition of a major product change was used on the questionnaire. This was defined as one that required retooling of production machinery plus at least one of (1) a change in the design of the product or (2) a change in the material used in the product. Nonmanufacturing concerns as well as manufacturing firms were encouraged to respond to this question to the best of their ability, although it was acknowledged on the questionnaire that this might prove to be more difficult for the nonmanufacturing firms. Of all responding firms, 82 percent ($n = 163$), including a proportional number of nonmanufacturing firms, answered this question.

Harvey (1968) suggested that the use of this measure would allow researchers to classify firms according to technological complexity, which he labeled "diffuseness." Thus, "technically specific" firms would have experienced relatively few product changes during a specified period and "technically diffuse" firms would have experienced a large number of product changes during the same period. There appeared the possibility that "diffuseness" and organizational environment as measured by complexity and stability factors might in some sense be thought of as related phenomena.

Hypotheses

Although the planning process was examined only on the production level by Woodward (1965), she suggested that there was a relationship between the "element of uncertainty" and production planning. Lawrence and Lorsch (1967) have argued that organizational success requires maintenance of differentiation and integration consistent with the demands of the environment. If the completeness of the long-range planning process can be seen as a reflection of the degree of structuring of the decision making tasks of the organization's internal environment as well as an attempt to meet the uncertainty in the external environment, it is apparent that completeness as a measure of structure should also be consonant with the environment. Thus, one would expect that as the complexity and instability of the organizational environment increase, the completeness of the long-range planning process also increases. Thompson (1967) has stated that organizations attempt to reduce uncertainty in their environment by creating the necessary structures to deal with the uncertainty. One way in which organizations might attempt to do this is to use a type of formal planning system. Another possibility is to utilize outside consultants and predictive models.

Burns and Stalker (1961) reported that the organic type structure, with lower centralization and formalization, is better suited to more dynamic environments. Because the organic structure is characterized by more participation and upward flows of information, one would expect that these characteristics would be more prevalent in those organizations that operate in dynamic environments.

Terreberry (1968) and others ("Long Range Planning," 1963) have concluded that the rapidity and complexity of environmental change increasingly precludes effective long-range planning. If this is in fact the case, one would expect organizations that do plan in dynamic environments to view the planning process from a relatively short range horizon as compared to organizations that plan in a less dynamic environment.

The following hypotheses were derived from the above to test the influence of organizational environment on the completeness of the long-range planning processes used by responding firms.

> *Hypothesis 1. As environmental dimensions of complexity and instability increase, the completeness of the long-range planning process will increase.*
>
> *Hypothesis 2. As the environmental dimensions of complexity and instability increase, emphasis on components of the long-range planning process will change as follows:*
>
> *a. use of uncertainty-reducing methods, specifically consultants and computer models, will increase.*
> *b. use of "open systems" approaches to planning as measured by more participation of lower organization levels, more upward flows of information, and more public information, will increase.*
> *c. the formal long-range planning process will have been in use for a longer period of time.*
> *d. long-range planning time span will be shorter.*
> *e. planning review periods will be shorter.*
> *f. planning premises will support more immediate and tangible goals, as opposed to longer-range and intangible goals.*

For each of the above hypotheses, a measure of the internal, external, and total environmental dimensions of complexity and stability was derived and a separate statistical test was performed for each measure.

Statistical Tests

The overall measures of planning completeness, organizational environment, and subfactors of both scales were used in the research for making ordinal determinations of the degree of completeness of the planning process versus the type of organization environment of the firms participating in the study. Thus, each hypothesis attempted to determine the degree of association between the level of planning completeness (or one of its subfactors) and the type or class of organizational environment.

The original research design used Kendall's tau as a test statistic for the hypotheses stated above. Overall scores for planning completeness and environmental "turbulence" (combining complexity and stability measures) were obtained and used to classify responses into groups for hypotheses tests. Statistical tests then were performed on the contingency tables thus generated. Results of those tests are given below.

In order to enrich the range of possible findings concerning the data, eight stepwise regression analyses were performed using the planning completeness components as dependent variables and the internal and external environmental complexity and stability scales, along with the company age and size (sales) as predictor variables. Thus, each equation took the general form of the following regression equation:

$$\text{Planning completeness factor} = B_1 \times \text{internal stability score} + B_2 \times \text{external stability score} + B_3 \times \text{internal complexity score} + B_4 \times \text{external complexity score} + B_5 \times \text{years company has existed} + B_6 \times \text{\$ sales volume}$$

The decision criteria used for stepwise entry of variables into the regression equations included a maximum of six predictors, given above, an entering F value of 2, and an additional percent variance accounted for of .005. These were considered appropriate for the exploratory nature of the study.

Data Analysis

Four scales were developed for use in analysis of the environmental data: (1) external complexity, (2) external stability, (3) internal complexity, and (4) internal stability. Zero-order correlations for external scale variables and internal scale variables were calculated. Significant correlations were found between a number of variables in each scale. Correlations for variables of each of the environmental scales were calculated. Also, Spearman's split-halves correlations for each scale were calculated (Table 4). These calculations show that all of the environmental scales appear to be reasonably reliable, with the external stability and complexity scales being somewhat weaker than the internal scales. (Detailed tables

TABLE 4
Spearman's Split-halves Internal Scale Reliability Correlations

	Internal	*External*	*Total*
Stability			
Internal	.754*	—	—
External	.451*	.529*	—
Total	.720*	.573*	.689*
Complexity			
Intmrnal	.744*	—	—
External	.490*	.526*	—
Total	.635*	.519*	.599*

*$p < .001$

showing all of these calculations are available upon request from the senior author.)

FINDINGS

Contingency Table Results

Scores on the complexity and stability measures were calculated for each firm. The firms then were ranked and dichotomized into equal groups. The scoring procedure has previously been discussed. Firms were grouped according to their complexity-stability scores into (1) simple-stable, (2) simple-unstable, (3) complex-stable, or (4) complex-unstable categories. Because all four categories were viewed as benchmarks along a continuum representing the total organizational environment with categories 1 and 4 representing the extremes, it was possible to combine the two middle categories into one category, which was relabeled compound-complex. By this process and the multiple cutoff process described earlier for the planning questionnaire, each firm was finally classified into one of three categories of planning (process) completeness and into one of three categories of organizational environment. Results showing responses of firms within environmental and planning categories have been included in Table 5. A separate score for internal, external, and total organizational environment was calculated and used to test each of the hypotheses. Chi-square tests were performed to determine if size of the firm had a significant effect on the classification of firms into one of the three environment categories. It was discovered that there were significant differences ($p < .10$) between the organizational environment of large (sales ≥ \$108 million) and small (sales < \$108 million) firms, so it was necessary to control for this variable in performing hypothesis tests. In selecting an appropriate sales level to measure the dividing line between small and large firms, the decision was made to use the sales of the 250th firm of the *Fortune* "Second 500" firms.

Results of the Regression Analyses

Using the nonparametric correlation procedures described earlier, it was found that planning completeness was significantly related ($p < .05$) to organizational environment as stated in Hypothesis 1 in large firms using the external and total environment measures. It approached significance ($p < .058$) using the internal environment measure. Although the relationship between the variables was in the predicted direction for small companies, it was not significant. Of the six parts of Hypothesis 2, the tests failed to confirm Part a, confirmed Part b for external environment in small and large firms, confirmed Part c for external and total environment in large firms, failed to confirm Part d, confirmed Part e for external environment in small and large firms and also for total environment in large

TABLE 5
Categories of Firms—Frequencies

	Environmental Condition										
	Simple/Stable		Complex/Stable		Simple/Unstable		Complex/Unstable		Totals		
Firm Size	Small	Large	Small	Large	Small	Large	Small	Large	Small	Large	Grand
Planning Components											
A. Planning completeness											
Class 1	8	7	3	1	—	2	4	7	15	17	32
Class 2	16	36	2	7	4	8	8	39	30	90	120
Class 3	4	11	1	3	1	1	4	21	10	36	46
B. Uncertainty reduction[a]											
Use planning consultants	7/28	8/54	0/6	1/11	0/5	0/11	3/16	20/67	10/55	29/143	39/198
Use planning models	8/28	29/54	0/6	6/11	0/5	5/11	5/16	33/67	13/55	73/143	86/198
C. Open systems approaches[a]											
Lower-level participation	13/28	43/54	3/6	10/11	2/5	7/11	5/16	52/67	23/55	112/143	135/198
Upward information flow	22/28	43/54	3/6	10/11	5/5	9/11	9/16	58/67	39/55	120/143	159/198
Public planning information	0/28	0/54	0/6	0/11	0/5	0/11	0/16	1/67	0/55	1/143	1/198
D. Planning existence											
0–2 years	11	14	4	3	1	4	6	15	22	36	58
3–5 years	9	17	2	8	2	4	5	13	18	42	60
5+ years	8	23	—	—	2	3	5	39	15	65	80
E. Time span of plan											
Less than 3 years	8	6	3	2	—	2	5	5	16	15	31
3–5 years	17	42	3	7	5	7	10	55	35	111	146
6–10 years	2	6	—	2	—	2	—	7	2	17	19
Over 10 years	1	—	—	—	—	—	1	—	2	—	2
F. Review of plans											
No specified review	8	11	2	2	—	5	3	11	13	29	42
At least semiannually	13	26	3	6	3	5	11	41	30	78	108
Annually	7	16	1	3	2	1	2	15	12	35	47
Every 1–3 years	—	1	—	—	—	—	—	—	—	1	1
G. Immediacy of goals											
Primarily long-term	0	1	0	0	0	0	0	2	0	3	3
Primarily short-term	10	36	3	6	1	6	7	24	22	72	94
High long-low short[b]	3	7	0	5	2	1	3	27	8	40	48
Low long-high short[b]	15	10	3	0	2	4	6	14	26	28	54

[a] Refers to positive responses as a fraction of total firms in category.

[b] Refers to the fact that some firms set many long-term goals (high) and few short-term goals (low) or vice versa (low long, high short).

TABLE 6
Kendall's Tau Values for Hypotheses Tests

Planning Components	External Small Firms (*n*=55)	External Large Firms (*n*=143)	Internal Small Firms (*n*=55)	Internal Large Firms (*n*=143)	Total Small Firms (*n*=55)	Total Large Firms (*n*=143)
1. Planning completeness	.054	.101**	.111	.088*	.078	.102**
2. Planning process						
a. Uncertainty reduction methods	-.034	.092*	.090	.038	-.072	.039
b. Open systems use	-.203**	.110**	.019	.046	-.137	.065**
c. Planning process development	.122*	.175***	-.020	.071	.004	.110**
d. Planning time span	-.143*	-.021	.048	-.064	-.104	-.024
e. Planning review frequency	-.179	-.114	-.004	-.051	-.027	-.136**
f. Immediacy of goals	.180**	.113**	.049	.088*	.114*	.089**

*$p<.10$
**$p<.05$
***$p<.01$

firms, and confirmed Part f for external environment in small and large firms and total environment for large firms. The Kendall's tau values for these tests are summarized in Table 6.

In summary, the hypotheses tests involving the external environment failed to confirm the first hypothesis and three of the six parts of the second hypothesis while controlling for small firms. The tests did confirm the first hypothesis and four of the six parts of the second hypothesis while controlling for large firms. The hypotheses tests involving the internal environment failed to confirm any part of either hypothesis, although several of the tests concerning large firms approached significance ($p < .10$). The tests involving total environment confirmed the first hypothesis and three of the six parts of the second.

Correlations of product changes with the organizational environment scales showed that a null hypothesis of independence between the measures could be rejected ($p < .05$). This indicated that the concepts of "diffuseness" and organizational environment as defined here are indeed related. The correlations are shown in Table 7. Although product changes as a measure of diffuseness were found to be significantly related to the scales used to measure environmental complexity and stability, they were not found to be significantly related to the measure of planning completeness, indicating that a more complex relationship may exist among these variables.

TABLE 7

Spearman's Correlations of Technological Diffuseness with Stability and Complexity

	Correlation Coefficients	*Significance*
Planning Completeness	.085	N.S.
Stability		
Internal	.165	*
External	.270	***
Total	.243	***
Complexity		
Internal	.178	*
External	.205	**
Total	.225	**

*$p < .05$
**$p < .01$
***$p < .001$

Although it must be recognized that there always is danger of drawing erroneous conclusions where small but significant correlations coefficients are involved with very large sample sizes, the size of the sample used for small ($n = 55$) and large ($n = 143$) firms in this study does not appear to be so large as to warrant rejection of the findings.

Results of the stepwise regression analyses are shown in Table 8. Only the beta values and the entering F values for variables meeting the predetermined criteria of $F > 2.00$ and .005 percent reduction in variability have been included in each equation.

TABLE
Results of Stepwise Regression Analyses of Planning Progress
(*N* =

			Independent			
			Internal Instability		*External Instability*	
Dependent Variables	*R*[a]	*F*[b]	*B*	*Fe*[c]	*B*	*Fe*[c]
Planning completeness	.303	6.615***			.201	11.443***
Uncertainty reduction methods	.229	5.375**				
Open systems use	.279	9.700***			.114	2.683
Planning process development	.350	9.004***			.188	11.511***
Planning time span	.217	4.821**				
Planning review frequency	N.S.					
Immediacy of goals						
Tangible goals	.380	6.500***	–.299	3.220*	.143	2.983*
Intangible goals	.485	11.793***	–.206	2.688*	.195	4.255*

[a] Multiple regression coefficient.
[b] *F*-statistic for the multiple regression.
[c] *F*-statistic associated with the addition of a variable in a stepwise regression procedure.
*$p < .05$
**$p < .01$
***$p < .001$

The regression equations show that overall planning completeness, the length of time that the planning process had been in use (process development), and the immediacy and type of goals were significantly related to the external stability dimension. In the case of goals, there were significant relationships with internal instability and internal complexity, as well. Either age, size of firm, or both variables were significantly related to every planning factor except 2e, which showed no significant relationships with any of the independent variables.

Variations in Regression Results

The Kendall's tau and stepwise regression results appear to be consistent and to complement each other. The former used an aggregate measure of environmental complexity and stability and focused on size effects. The latter used separate measures of environmental complexity and stability and also included the age of the firm and its size as independent variables.

The Kendall's tau analysis showed considerable differences between large and small firms in the areas of planning completeness, use of open systems approaches, and length of time in which the planning process has been under development. These differences were most pronounced in relation to the external environmental measure.

The use of stepwise regression analysis permitted further insight into the source of those variations. In each case the *stability* component was the dominant factor in the external environmental measure which tended to explain variations in the dependent planning variables. In addition, the effects of age of the firm and size of the firm could be seen more clearly as a result of this analysis.

8
Components with Environmental and Age/Size Factors
197)

Variables							
Internal Complexity		External Complexity		Age		Sales	
B	Fe^c	B	Fe^c	B	Fe^c	B	Fe^c
				.147	5.485**	.106	2.238
				.170	7.373**	.128	3.292*
						.257	16.574***
				.192	9.773***	.152	4.788**
				.177	2.008	.100	7.600**
.362	7.199***			.183	6.399***	.171	11.208***
.393	24.189***			.229	15.397***	.150	7.864***

DISCUSSION AND CONCLUSIONS

Several findings arising from the data analysis should be noted. First, the internal environment measure, unlike the external environment measure, showed no significant relationship to completeness of the long-range planning process. It is unlikely that there was a significant defect in construction of the internal environmental scale. It paralleled the technique used to measure the external environment. The validity tests, reported above, also seem to rule out this possibility. Two other possible explanations might be considered. The simpler one is that companies tend to ignore internal conditions in carrying out long-range planning. Another more complex explanation suggested by Huber, O'Connell, and Cummings (1975) is that, due to the availability of information about internal environmental factors, they are considered to be of secondary importance. That arises because there is less perceived uncertainty arising out of the internal environmental sector than the external environmental sector. With a more objective measure of complexity this might or might not be supported.

Hypothesis 1 was based on the premise that a change in environment will tend to force evolution toward a more complete planning process. Although it might be argued that a more complete planning process would tend to increase managerial awareness of environmental complexity and variability, there is some evidence that completeness of the process did not have a significant impact on the perception of complexity and stability of the environment by the respondents to this study. The number of product changes, used to measure technological differences, provided an objective measure of complexity and stability and served as a check on managers' perceptions of their reported environmental complexity. This again points to the need for additional development of strong objective, as well as subjective, measures of environmental complexity and stability.

Another finding was that the degree of openness in long-range planning processes is directly related to the degree of environmental complexity and instability for large firms, but inversely related for small firms. This possibly suggests that the top management of small firms tends to centralize planning under adverse conditions and to trust more in their own judgments, but managers in large firms tend to be more open to information from as many sources as possible. Another plausible explanation is that large firms have more resources to deploy for information gathering purposes than do small firms.

Finally, a surprising inverse relation was discovered between "planning review frequency" and organizational environment. Apparently, because of the difficulty of forecasting under complex and unstable environmental conditions, managers see less need for frequent evaluation of their long-range plans. Once again, the experimental evidence for this conclusion was stronger for large firms than for small ones.

In summary, the evidence obtained from this exploratory study suggests that large business firms in a variety of industries are attempting to "fit" their long-range planning processes to their perceived environmental conditions, that a number of the strategies used to achieve this fit are in line with concepts developed by organization theorists, and that small firms should be considered as a separate class in this and future related studies.

This study dealt with a large sample study of a variety of organizations in durable, nondurable, and service industries and focused on the specifics of the boundary-spanning process of long-range planning. Findings were mixed, but they suggest that organizational environment, firm size, and age of the firm are important contingent variables to consider in the design of an effective and efficient long-range planning process. Hofer (1975) has suggested the need for more studies such as this in order to develop a more complete contingency theory of business and corporate strategy.

The following are suggestions for possible extensions of the present research that may meet some of the needs suggested in recent literature.

1. Determine if there are "life cycles" of long-range planning processes, and, if so, the extent to which they are correlated to corporate and product "life cycles."
2. Determine at what point formal long-range planning emerges as an identifiable function in small business within different environmental circumstances.
3. Determine the extent of "overplanning and underplanning" in different industries and investigate the criteria by which long-range planning is considered to be effective and efficient.
4. Determine to what extent the practice of formal corporate planning affects the environment within which it takes place.

Efforts to develop a fuller understanding of the planning process must be undertaken if a contingency approach to business policy is to be developed. Moberg and Koch (1975) have pointed out that successful application of contingency findings requires: (1) situational diagnosis, (2) self-awareness, and (3) facing up to the challenges of using more complex decision making and problem solving processes. Decision makers in today's changing environments appear to be ready to deal with the complexity of contingency theories in order to improve their decisions. As Drucker (1972) points out, "long-range planning means risk-taking."

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Dimensions of Organizational Structure: A Critical Replication[1]

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In a critical replication and extension of the Aston and National studies on the dimensions of organizational structure, a strong linkage was suggested between decentralization of operations, (but not of more strategic decision taking) and formalization, functional specialization, and professional qualifications of officeholders, so providing substantial support for the concept of a bureaucratic strategy of control.

This paper has three purposes: (1) to replicate the Aston study, (2) to link empirically the macro-organization and strategy-structure schools, and (3) to address the controversy on the relationship between centralization and formalization. A further replication of the Aston study is necessary, despite the number of such exercises, such as Hinings and Lee (1971), Child (1972), Donaldson and Warner (1972, 1974a, 1974b), Greenwood and Hinings (1974), and Hinings, Ranson, and Bryman (1976), in order to achieve the second and third objectives. Results similar to those obtained by earlier studies, but with a more homogeneous sample drawn from a single industry, also would further substantiate the predictive power of the Aston findings.

The second purpose, however, is more important. Studies by the macro-organizational theorists, like the Aston researchers, have proceeded without recognition of the growing literature on the relationship between strategy and structure, and vice versa. This is due largely to differences in the conceptual origins of the schools. The macro-organizational theorists have drawn their inspiration largely from Weber (1947), but researchers such as Stopford (1968), Wrigley (1970), Channon (1973, 1975), Rumelt (1974), and Grinyer, Yasai-Ardekani, and Al-Bazzaz (1980) have employed nominal or ordinal scales based on the ideas of Chandler (1962) and Scott

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(1971). Although these scales are more subjective than are those of the macro-organizational researchers, the empirical research has produced consistent results of both explanatory and predictive value. Because the two schools have studied the same organizational phenomena but from different perspectives and using different conceptual models, both could be enriched by establishing empirical linkages between measures of bureaucracy or structuring and an ordinal scale based on Chandler's (1962) organizational taxonomy. Moreover, such a linkage may be hypothesized because of the need for more specialist staff, procedures, and written documents to permit effective coordination and control from the central or general office within multidivisional structures. Consequently, an ordinal scale similar to those used by Wrigley (1970), Channon (1975), Rumelt (1974), and Grinyer et al. (1980) was introduced into the analysis.

Finally, the third purpose is important because conflicting evidence has been obtained on the relationship between formalization and centralization, a fundamental aspect of bureaucracy. Pugh, Hickson, Hinings, and Turner (1968) found no significant association between the two measures,

TABLE 1
List of Hypotheses and Summary of Results of Statistical Analyses

No.	*Hypothesis*	*Source of Literature*	*Results of Correlation Analyses in Relation to Literature*
H.1	Vertical span of control is positively correlated with: Formalization	Weber (1947), Pugh et al. (1968), Hinings & Lee (1971), Child (1972)	Significant at .001 level for both the full and manufacturing only samples. Confirmed the earlier findings by Pugh et al. (1968), Hinings and Lee (1971) and Child (1972). However, the coefficient found by Pugh et al. for their manufacturing only sample was significant at the .05 level.
H.2	Functional specialization	Weber (1947), Pugh et al. (1968), Hinings & Lee (1971), Child (1972)	Significant at the .001 level. Confirmed earlier findings of Pugh et al. (1968), Child (1972) and Hinings and Lee (1971).
H.3	Professional qualifications	Weber (1947)	Significant at the .001 level. Confirmed Weber's (1947) proposition.
H.4	Decentralization	Pugh et al. (1968), Child (1972)	Significant at the .001 level for both the full and manufacturing only samples. Confirmed earlier findings of Child (1972). Pugh et al. (1968) also reported a positive coefficient which was only significant at .05 level for the full sample and at .01 level for their manufacturing only sample.
H.5	Lateral span of control	Pugh et al. (1968), Grinyer et al. (1980)	Significant at .01 level for the full and .05 level for the manufacturing only samples, respectively. In the latter case confirmed Pugh et al.'s (1968) result for their manufacturing sample. The coefficient also supports the earlier finding of Grinyer et al. (1980).
H.6	A/P ratio	Pugh et al. (1968)	Significant at the .05 level for the manufacturing only sample. Confirmed Pugh et al.'s (1968) result of manufacturing only sample. The result is contrary to findings of Child (1972) and Hinings and Lee (1971).
H.7	Formalization is positively correlated with: Functional specialization	Weber (1947), Pugh et al. (1968), Hinings & Lee (1971), Child (1972)	Significant at the .001 level. Confirmed earlier findings of Pugh et al. (1968), Hinings and Lee (1971), and Child (1972).

TABLE 1 (continued)
List of Hypotheses and Summary of Results of Statistical Analyses

No.	Hypothesis	Source of Literature	Results of Correlation Analyses in Relation to Literature
H.8	Professional qualifications	Weber (1947), Child (1973)	Significant at the .001 level. Provided substantial support for Weber's proposition and confirmed earlier result of Child (1973).
H.9	Decentralization	Child (1972)	Significant at the .01 level for both the full and manufacturing samples. Confirmed the earlier findings of Child (1972) and was contrary to that of Pugh et al. (1968) and Hinings and Lee (1971).
H.10	A/P ratio	Pugh et al. (1968), Hinings & Lee (1971)	Significant at .01 level for the full and at .05 level for the manufacturing only sample. Confirmed the earlier findings of Pugh et al. (1968) and Hinings and Lee (1971) but was contrary to Child's (1972) result.
H.11	Functional specialization is positively correlated with: Professional qualifications	Weber (1947), Hage (1965), Child (1973)	Significant at .001 level. Provided substantial support for Weber's (1947) proposition and confirmed earlier findings of Hage (1965) and Child (1973).
H.12	Decentralization	Hage (1965), Pugh et al. (1968), Hinings & Lee (1971), Child (1972)	Significant at the .001 level. Confirmed earlier findings of Hage (1965), Pugh et al. (1968), Hinings and Lee (1971), and Child (1972).
H.13	A/P ratio	Pugh et al. (1968)	Significant at the .01 level. Confirmed earlier findings of Pugh et al. (1968) and Hinings and Lee (1971). Contrary to Child's (1972) finding.
H.14	Professional qualifications is positively correlated with: Decentralization	Hage (1965), Child (1973)	Significant at the .001 level for both the full and manufacturing only samples. Confirmed earlier findings of Hage (1965) and Child (1973).
H.15	A/P ratio	New hypothesis	Significant at the .05 level. Confirmed the hypothesis.
H.16	Decentralization is positively correlated with: A/P ratio	Pugh et al. (1968)	Not significant. Confirmed earlier findings of Child (1972) and Hinings and Lee (1971). Contrary to Pugh et al.'s (1968) finding.
H.17	Type of structure, SHAPE, is positively correlated with: Vertical span of control	Grinyer et al. (1980)	Significant at the .001 level. Confirmed the finding of Grinyer et al. (1980).
H.18	Formalization	New hypothesis	Significant at the .01 level. Confirmed the hypothesis.
H.19	Functional specialization	New hypothesis	Significant at the .001 level. Confirmed the hypothesis.
H.20	Professional qualifications	New hypothesis	Significant at the .05 level. Confirmed the hypothesis for the manufacturing only sample.
H.21	Decentralization	New hypothesis	Significant at the .05 level. Confirmed the hypothesis.
H.22	Chief executive's span of control	Grinyer et al. (1980)	Significant at the .01 level. Confirmed the earlier finding of Grinyer et al. (1980).
H.23	A/P ratio	New hypothesis	Significant at the .01 level. Confirmed the hypothesis.
H.24	Decentralization is unrelated to autonomy.	New hypothesis	Not significant. Confirmed the hypothesis. Contrary to earlier findings of Pugh et al. (1968) and Child (1972).

but Child (1972) reported a strong negative correlation and argued for bureaucracy as a strategy of control of decentralized decision taking. The issue is clearly central to the nature of bureaucracy as an empirically observed phenomenon. Yet the one attempt to resolve the controversy (Donaldson, Child, & Aldrich, 1975) yielded inconclusive results. Further research into this aspect of bureaucracy is clearly needed.

To achieve the three purposes of the research a series of hypotheses was tested. These hypotheses are listed in Table 1, together with references to the literature. (In order to contrast the present study with the earlier Aston and National studies, it will be called the CUBS study because it was started at The City University Business School, London.)

METHOD

Sample

The sample frame was 502 electrical engineering companies in the southeast of England listed in the "Report on Census of Production, 1968, Directory of Business for the Electrical Engineering Industry." Random sampling of the population led to the final sample of 45 companies, distributed as in Table 2. Structured interviews were used to collect data from the chief executive or another senior manager to whom the researchers were referred by him. Interviews were conducted between July 1975 and March 1976.

Ideally, a larger sample would have been used and multiple interviews conducted within each company. This was prevented due to both time and resource constraints. Even so, the sample of 45 companies is only one less than that used in the final analysis by the original Aston researchers and, moreover, did not include multiple branches of the same organization as did theirs. It is considerably smaller, however, than Child's National sample of 82 organizations. But, being drawn from one industry, it is considerably more homogeneous. Errors introduced by using perceptions of only one interviewee within each organization may be expected to generate "noise" but not systematic biases. This would thus tend to reduce the size of correlations found. It therefore is of considerable interest that many of the correlations were so highly significant.

Scales

Because the full study is wider than dimensions of structure and includes contextual variables such as size and technology to which reference is made in later papers, characteristics of the companies were measured by 357 variables, some of which subsequently were added together to form new scales. Variables obtained by summation of items were subjected to item analysis as in the original Aston studies and were found to be reliable. (Details of scales may be obtained by writing to authors.) To permit

TABLE 2
Sample of 45 Companies Stratified by Size and Industrial Classification

Company Size Categories (No. of Employees)			Number of Companies in the Sample in Each Standard Industrial Classification								
Range	Mean	Standard Deviation	Components	Capital Goods	Miscellaneous	Machines	Broadcasting	Domestic	Computer	Telephone & Telegraph	Total
35-89	60.4	16.7	3	2	1		1				7
100-200	134.2	32.0	1	1	2	2					6
250-350	295.6	43.3	3	1	1	2	1	1			9
400-600	505.3	81.3	1	2	3	1	1		1		9
655-1600	1082.5	326.0	1	3	1	1		1		1	8
2300-3500	2766.6	524.9	1	1				1			3
4500-17000	9166.6	5572.7		1			1	1			3
			10	11	8	6	4	4	1	1	45

replication of the Aston studies, scales for formalization (use of written documents), functional specialization, decentralization, and autonomy are largely as proposed by Inkson, Pugh, and Hickson (1970). Like Child's (1973), the scale for professional qualification gives the number of nonworkflow functions in which at least one specialist held a recognized professional qualification. The orthodox measures of pyramidal structure—namely, vertical span, lateral span, and administrative/direct production employees (A/P) ratio—were supplemented by a further ordinal scale drawn conceptually from the work of Chandler (1962), Scott (1971), Stopford (1968), Wrigley (1970), Channon (1973), and Rumelt (1974). Within this ordinal scale for structure (SHAPE), organization types are scored in order of increasing complexity, from owner-manager (0), through functional, more elaborate functional, holding company, multidivisional without a well defined general office, fully multidivisional with general office, to elaborate multidivisional with partitioning on both product and worldwide geographical bases (6).

Unless indicated to the contrary in the footnotes, all the correlation coefficients in the tables presented are product moment. Strictly, correlations involving SHAPE should be nonparametric, as argued forcefully by Siegel (1956). But Labovitz (1970) has demonstrated the suitability of the product moment coefficient where linearly equidistant, sequential numbers are applied to ordered categories especially where the number of ranks is large. Moreover, Havlecik and Peterson (1977) have shown that failure to meet the basic assumptions had little effect on the distribution of Pearson's product moment coefficients obtained. Because tests using the product moment correlation coefficient have greater discriminatory power, there is some advantage in their use where suitable. This is especially so where, as in this study, all but one scale are ratio, interval, or of linear equidistant nature. Hence, in the CUBS study both parametric and nonparametric correlation coefficients were calculated. The latter were found to be the same in direction and very close in size and significance to the former. Consequently, product moment correlation coefficients have been used throughout, except where the underlying assumptions of normality and linearity were called into question.

STATISTICAL ANALYSIS

The left-hand side of Table 3 shows results of correlation analysis for all 45 companies in the full CUBS sample. Five of these had service operations. Removal of these five gave a sample which was analyzed separately to allow comparison with relationships found by Hinings and Lee (1971) and Pugh et al. (1968) for their Coventry and Aston study "manufacturing only" subsamples. The resulting coefficients are shown on the right-hand side of the diagonal in Table 3 where significant. Where appropriate, comparable results from the Aston, National, and Coventry studies also are shown in Table 3 for ease of comparison.

Replication of Aston and National Studies

From Table 3 it may be seen that the findings of the CUBS study are broadly consistent with those of the Aston and National studies. Formalization, functional specialization, vertical span of control, and the A/P ratio are all significantly, positively intercorrelated as aspects of bureaucracy. Inclusion of the A/P ratio in this cluster supports the Aston rather than the subsequent National study and also makes intuitive sense, for a higher administrative burden is a widely observed cost of bureaucracy. Moreover, the number of offices held by qualified persons, "qualifications," also was found to be positively correlated with these measures of bureaucracy, so confirming Weber's (1947) contention that appointment of qualified officeholders is a feature of bureaucracy. In this respect the CUBS study supported Child's (1973) finding but extended it by also showing positive relationships between qualifications and the chief executive's lateral span of control, vertical span of control, and the A/P ratio. Centralization, as noted earlier, was an issue on which the Aston and National studies differed markedly. The CUBS study provides strong support for the National study. Thus decentralization is seen to be an integral aspect of bureaucracy as a strategy of control (discussed more fully later). The statistical analysis then suggests acceptance of Hypotheses 1 to 15 and 17 to 24 but rejection of Hypothesis 16. Only in rejecting the relationships between autonomy and bureaucracy does the CUBS study differ from both the Aston and National studies. Given the wide differences between the samples, this is truly remarkable, and suggests that the original Aston methodology has considerable predictive power.

Lateral Span of Control and Bureaucracy

One interesting difference between the CUBS and both the Aston and National studies was that the latter found no relationship between the horizontal span of control of the chief executive and other measures of structural configuration. In the CUBS sample, horizontal span of control is positively correlated with vertical span, A/P ratio, qualifications of officeholders, and formalization, suggesting that it, too, may be an aspect of bureaucracy. Given that the chief executive officer in a bureaucracy is likely to supplement functional, line executives with staff officers operating bureaucratic controls, this is scarcely surprising. This is particularly so in divisionally structured, more complex, forms of organizations which tend to be associated with wider horizontal spans of control.

Structure and Bureaucracy

Hypotheses 17 to 23 express anticipated relationships between the ordinal scale for structural complexity, based on the strategy/structure school emanating from Chandler (1962), and Aston measures of bureaucracy.

TABLE
Correlation Coefficients for Measures of

		1	*2*	*3*	*4*
1. Chief executive's span of control	C	—	NS	.36*	.36N**
	A	—	NS	.38*	NS
	N/S	—	NS	NS	NS
2. Subordinate ratio	C	NS	—	NS	NS
	A	NS	—	NS	NS
	N/S	NS	—	NS	-.59*
3. Vertical span of control	C	.37**	NS	—	.25N*
	A	NS	NS	—	.30*
	N/S	NS	-.28*	—	NS
4. Administrative/production (A/P) ratio	C	.33N**	NS	NS	—
	A	NS	NS	NS	—
	N/S	NS	NS	NS	—
5. Type of structure (SHAPE)	C	.43**	NS	.56***[b]	.33N**
6. Qualifications	C	.22N*	NS	.57***	.26N*
7. Formalization	C	.19N*	NS	.56***	.28N**
	A	.32*	NS	.48***	.46**
	N/S	NS	NS	.48***	NS
8. Functional specialization	C	NS	NS	.63***	.31N**
	A	NS	NS	.57***	.58***
	N/S	NS	NS	.51***	NS
9. Autonomy	C	NS	-.27N*	NS	NS
	A	NS	NS	NS	-.32*
	N/S	NS	NS	NS	NS
10. Centralization	C	NS	NS	-.46***	NS
	A	NS	NS	-.28*	-.40**
	N/S	NS	.41***	-.41***	NS

[a] Figures shown are the first two significant. Coefficients for full samples are shown to the left of the diagonal and for the manufacturing only samples to the right of the diagonal.

[b] These correlations were confirmed by nonparametric correlation (Kendall's tau).

[c] Pearson's coefficient was significant at the .05 level but Kendall's tau was not. When the only branch company was removed, the Pearson coefficient also became insignificant.

N: Pearson's product moment correlation produced no statistically significant coefficient. The correlation shown is Kendall's tau.

NS: The coefficient was not statistically significant.

N/A: The measure is either not used by other studies or the coefficient is not available.

C: The City University Business School (CUBS) study.

A: The Aston study.

N/S: The National study.

H: The Coventry study.

*$p<.05$

**$p<.01$

***$p<.001$

Table 3 shows that these hypotheses are accepted in the CUBS study. The ordinal scale for complexity, or divisionalization, of structure is positively correlated with each of formalization, functional specialization, A/P ratio, vertical and lateral spans of control and negatively with centralization. Thus greater structural complexity, and divisionalization, are shown clearly to involve greater bureaucracy.

Autonomy, Centralization, and Structuring of Activities

As mentioned above, Pugh et al. (1968), Hinings and Lee (1971), and Donaldson et al. (1975) found no significant correlation between

3

Structuring, Complexity, and Configuration[a]

5	*6*	*7*	*8*	*9*	*10*	
.42**	.32*	.21N*	NS	NS	NS	C
N/A	N/A	.44**	NS	N/A	NS	A
N/A	N/A	NS	NS	N/A	NS	H
NS	NS	NS	NS	-.26N*	NS	C
N/A	N/A	NS	NS	N/A	NS	A
N/A	N/A	NS	NS	N/A	NS	H
.57***	.64***	.60***	.66***	NS	-.50***	C
N/A	N/A	.37*	.66***	N/A	-.42**	A
N/A	N/A	.76**	.80**	N/A	NS	H
.30N**	.37*	.31*	.30*	NS	NS	C
N/A	N/A	.38*	.63***	N/A	-.35*	A
N/A	N/A	.68*	.76**	N/A	NS	H
—	.30*	.42**	.46***	NS	-.34*	C
NS	—	.82***	.80***	NS	-.52***	C
.38**	.79***	—	.71***	NS	-.43**	C
N/A	N/A	—	.77***	N/A	NS	A
N/A	N/A	—	.86***	N/A	NS	H
					-.72***	N/S
.44***	.78***	.70***	—	NS	-.68***	C
N/A	N/A	.57***	—	N/A	-.66***	A
N/A	.72***	.69***	—	N/A	-.81**	H
					-.59***	N/S
NS	NS	NS	NS	—	NS[c]	C
N/A	N/A	NS	.50***	—	N/A	A
N/A	N/A	NS	NS	—	N/A	H
-.29*	-.52***	-.43**	-.63***	NS[c]	—	C
N/A	N/A	NS	-.64***	-.79***	—	A
N/A	N/A	-.53***	-.28*	-.42***	—	H

centralization and formalization, a fundamental aspect of bureaucracy (Weber, 1947), but found centralization correlated with autonomy. Child (1972) disputed this finding and maintained that decentralization is a feature of bureaucracy as a strategy of control. Table 3 shows that the CUBS findings, like those of Child (1972), contradict those of the Aston study. Moreover, unlike Child's (1972), they suggest no relationship between autonomy of the organizational unit and centralization.

To confirm this, the multivariate analysis undertaken by Pugh et al. (1968) and Child (1972) was replicated. Unrotated, varimax rotated, and obliquely rotated factors were highly stable and very similar to those found in the Aston and National studies. (Tables presenting the results of the factor analysis have been omitted because of space constraints. They are given in a working paper of the City University, issued in 1978, and available from the authors.) Varimax rotation of the principal components again yielded a structuring factor, which accounted for most of the variance, and on which vertical span, formality, functional specialization, and qualifications of officeholders, and the new ordinal scale of structural complexity, SHAPE, were all highly, positively loaded. Moreover, as found by Child (1972), but not Pugh et al. (1968), centralization was highly, negatively loaded on this factor. A second, independent factor contributing to centralization was also found, as well as a third representing the configuration of the organizational structure and autonomy (negatively). The remaining factor represented the number of degree holders. With Child (1972), the CUBS study supports the Weberian concept of an association between written procedures, documents, and qualified persons holding specialized offices with clearly specified roles, and decentralization of the locus of decision taking. Bureaucracy, then, is a strategy of knowledge based control that permits such decentralization.

A Deeper Analysis of Centralization

Existence of a separate factor representing centralization cast doubt on the meaning of the Aston centralization scale. Mansfield (1973) had already challenged the adequacy of the scale on the grounds that it represented an average of the extent to which the locus of decision taking was centralized over a range of decisions rather than a vector quantity. The low mean item analysis value of .40 obtained in the Aston study (Pugh et al., 1968) certainly suggests that the vectors of individual decision items which are summed to give the total score may be different in direction. However, item analysis of the CUBS data showed all but one of the items to be correlated positively with the total at the .05 level of significance at least, and the reliability coefficient, alpha, was high (.91). These results suggest that the scale used in the CUBS study is adequate.

Wide differences in the sizes of the interitem correlation coefficients suggested, however, that factor analysis of scales for different types of decisions might yield interesting clusters. Oblique rotation of the principal components yielded five factors, or groups of decisions. Factor 1 represented centralization of production decisions (appointment, promotion, and salary of supervisory staff, type of new equipment, altering areas of work of line departments, and creation of new jobs); factor 2, centralization of marketing decisions (determining new products, marketing territories, extent and type of markets, and sales price of products); factor 3, centralization of decisions on extrabudgetary financial expenditure on both capital and revenue items; factor 4, centralization of personnel and buying decisions (dismissing supervisors, training methods, buying procedures, and suppliers of raw materials); and factor 5, centralization of decisions on organizational change (altering areas of work of specialist departments and creation of new departments). The factors for centralization of decisions on production, personnel and buying, and organizational change were all positively correlated at the 5 percent level at least, but the factor for marketing decisions was significantly correlated with the factor for production decisions alone; and centralization of decisions on extrabudgetary expenditure was not significantly correlated with any of the other factors.

This indication that centralization of marketing and financial decisions is not in the same cluster as the other three categories suggested that use of the Aston centralization scale might obscure important relationships. Consequently, five indices of centralization were obtained by adding the scores for decisions loaded significantly on each of the five factors; and a sixth—an overall centralization score for production, personnel and buying, and organizational change—was obtained by summing the scores for these intercorrelated factors. Table 4 shows the correlation coefficients between these, as well as the original measure of centralization, and the structural variables. The extent to which the Aston centralization scale masks differences between the groups of items it comprises is obvious. Indeed, according to Greenwood and Hinings (1976), the Aston team itself recognized this and undertook principal component analysis to obtain groupings of items with a higher reliability, but none was found. However, when the Aston team subjectively grouped the decision items into three categories, the resulting mean item analysis values were high, and so Greenwood and Hinings followed this approach in their study of local authority departments.

Decentralization of production, personnel and buying, and organizational decisions is highly significantly associated with vertical span, SHAPE or complexity of the overall organizational structure, professional qualifications of officeholders, formalization and functional specialization. Scales for centralization of decisions on marketing and unbudgeted expenditure are not so associated, with the exception of a weakly significant correlation between centralization of marketing and functional specialization, but both are highly, negatively correlated with autonomy. This difference perhaps is to be expected. Decisions on production, personnel, buying, and departmental responsibilities are operating in character. Their decentralization in a bureaucracy is completely consistent with Weber's ideal type. On the other hand, marketing decisions relate the company to its environment, and being more strategic are more likely to be taken by senior management in bureaucratic and nonbureaucratic organizations alike. Similarly, budgetary control provides a bureaucratic framework within which authority to spend is delegated safely to lower hierarchical levels. Consequently, decentralization of decisions on extrabudgetary expenditure would be inconsistent with bureaucracy as a means of control. The highly significant correlations between autonomy and centralization of both marketing and extrabudgetary expenditure decisions again make sense intuitively. Where subsidiary companies have little autonomy, the chief executive is actively involved in accounting to higher

TABLE 4
Centralization and Measures of Structuring and Configuration

Measure	*Aston Centralization Scale (1)*	*Centralization of Production Decisions (2)*	*Centralization of Marketing Decisions (3)*	*Centralization of Extra-Budgetary Expenditure Decisions (4)*	*Centralization of Personnel and Buying Decisions (5)*	*Centralization of Organizational Change Decisions (6)*	*(2)+(5)+(6)*
Chief executive's span of control	NS	NS	NS	NS	NS	NS	NS
Subordinate ratio	NS	NS	NS	NS	NS	NS	NS
Vertical span of control	-.46***	-.52***	NS	NS	-.63***	NS	-.57***
Administrative/production employee ratio	NS	NS	NS	NS	NS	NS	NS
Type of structure (SHAPE)	-.29*	-.35**	NS	NS	-.38**	NS	-.38**
Professional qualifications	-.52***	-.52***	NS	NS	-.46***	-.43**	-.57***
First degree holders	-.50***	-.43**	-.47**	NS	-.28N**	-.31N**	-.41**
Higher degree holders	-.37*	-.30*	NS	NS	-.33N**	-.22N*	-.40N***
Formalization	-.43**	-.46***	NS	NS	-.48***	-.34*	-.52***
Functional specialization	-.63***	-.63***	-.30*	NS	-.58***	-.42**	-.67***
Autonomy	NS[a]	NS	-.42**	-.42**	NS	NS	NS

[a] Pearson's coefficient was significant but Kendall's tau was not.

NS: The correlation was too small to be statistically significant.

N: Pearson's product moment correlation produced no statistically significant coefficient. The correlation shown is Kendall's tau.

*$p < .05$

**$p < .01$

***$p < .001$

level management for both sales and financial performance. Under these circumstances he may be obliged to refer decisions on marketing and extrabudgetary expenditure to a higher body. Even where this is not so he is likely to retain them himself.

The correlation analysis suggests, then, that the negative correlation between centralization and measures of structuring, or bureaucracy, found by Child (1972) related to lower level operating rather than marketing or financial decisions. As was to be expected, further factor analysis also yielded the same conclusion, operating but not marketing or financial control decisions being heavily, negatively loaded on the factor representing structuring or bureaucracy in each of the factor pattern matrices.

SUMMARY AND DISCUSSION

For convenience, Table 1 also summarizes the main results of the statistical analysis and their relationship with the literature.

Bureaucracy, as observed by Weber (1947), was defined as a type of organizational response to needs created by, for instance, size and complexity. Described in qualitative terms, the characteristics of bureaucracy could be present or absent, but were not measurable on other than such a binary scale. Pugh et al. (1968), Inkson et al. (1970), Hinings and Lee (1971) and Child (1972) demonstrated convincingly that the specific qualities of bureaucracy might be conceptualized and measured as a matter of degree. They thus used ratio scales. Moreover, they found that variables representing the vertical span of control, or height of the organization, degree of formalization, and extent of functional specialization varied together. This clearly provided substantial empirical support for the existence of Weber's (1947) bureaucracy as an observable phenomenon, but it also allowed a more refined treatment of its degree and variants. Child (1973) extended this work by finding that the extent to which specified offices or posts were filled by professionally qualified persons was associated with these other characteristics. Further weight is added to these findings by their recurrence in the CUBS study of companies in the UK electrical engineering industry. Weber's model of bureaucracy as an approach to the exercise of control based on knowledge of qualified officeholders clearly has considerable descriptive power.

However, the earlier studies, despite their considerable agreement, left decentralization of decision taking as an aspect of bureaucracy in some doubt. The Aston researchers, including Pugh et al. (1968), Inkson et al. (1970), Hinings and Lee (1971), and Donaldson et al. (1975), found no relationship between centralization and formalization, and they rejected the association of decentralization with measures of structuring or bureaucracy. Child (1972) produced contrary results and argued powerfully that decentralization is an important element of structuring or bureaucracy as a potent strategy for control. Results from the CUBS study support the claim of Child (1972) that the use of formal procedures, roles, and specialized offices may be seen as a means of controling use of decentralized decision making authority. Moreover, they add empirical support to Hage's (1965) proposition that the use of professionally qualified officeholders, a further aspect of bureaucracy, permits greater decentralization of decision taking. Thus centralization was found to be significantly related to aspects of bureaucracy and not to autonomy as suggested by the Aston studies. One implication of this conclusion is that use of autonomy to measure centralization, as in the abbreviated scales of Inkson et al. (1970), is potentially misleading.

Moreover, further analysis showed that the use of a single scale in the Aston and National studies masked considerable differences among different areas of decision making. In particular, decisions on production, personnel, buying, and design of departmental responsibilities tended to be decentralized in more bureaucratic or structured organizations, but those on marketing and extra budgetary expenditure were not. The latter tended to be decentralized, however, in companies with relatively more autonomy. These extended findings on decentralization further refine but do not detract from the empirical support given to Weber's (1947) model. The strength of bureaucracy as what Child (1972) has called a strategy of control is that it permits the safe delegation, or decentralization, of operational decisions to appropriate, lower hierarchical levels, but allows the center or higher hierarchical levels to retain control via procedural devices such as budgetary control. Had the results been different with respect to extrabudgetary expenditure, there would have been grounds for doubting the efficiency of bureaucracy as a "strategy for control." Nor does the lack of decentralization of major marketing decisions in bureaucracies create difficulties. Writers on bureaucracy have focused on operational decisions, on the whole, and it is in their decentralization that its essence lies. This in no way is inconsistent with retention of more strategic decisions on markets by senior management. Bureaucracy permits safe delegation of operational decisions to lower hierarchical levels by constraining their scope on the one hand and ensuring professional competence of officeholders on the other. Wider, strategic decisions perhaps can only be taken at or near the top, where the constraints have been loosened and management has wider vision. Indeed, the whole of the bureaucratic framework could be conceived as a means of ensuring efficient implementation by lower levels of such strategic decisions.

Unlike Pugh et al. (1968) and Child (1972), the CUBS study found that the horizontal span of control of the chief executive tended to be wider where organizations were taller, used more qualified staff, had a higher ratio of administrative to production employees, and were more formal. Given the use of more specialist staff to assist in bureaucratic control (and often reporting directly to the chief executive), this result was perhaps to be expected. It was also consistent with the earlier findings by Grinyer et al. (1980). Moreover, each of the measures of configuration and bureaucracy, with the expected exception of the number of subordinates per first line supervisor, was related to the new 7-point ordinal scale of structural complexity, or divisionalization. More complex and at the extreme divisional, structures tend to be wider, taller, use more administrative staff per direct production workers, use more qualified officeholders, more functional specialization, and more written, formal procedures, while decentralizing operating decision taking. In brief, they tend to be more bureaucratic with attendant higher costs in terms of administrative personnel. Hence the results confirm Weber's contention that bureaucracy typifies more complex organizations. Given that Grinyer et al. (1980) have already shown that size and a similar ordinal scale of structural complexity are strongly related, and given that a further paper extending the discussion of the CUBS study results to contextual variables supports their finding, it may be seen that Weber was right, too, in stressing that such organizations tend to be large.

Addition of the ordinal scale for structural complexity has, as suggested in the introduction, another value, too. Chandler (1962), Scott (1971), Stopford (1968), Wrigley (1970), Channon (1973), and Rumelt (1974) have all suggested that diversification of business activities is accompanied by adoption of more complex organizational structures, and in particular divisional structures. Stopford (1968) and Rumelt (1974) have supported their cases for multinational and USA companies, respectively, with results of statistical analysis. Channon (1975) does the same for UK service industries, and Grinyer et al. (1980) also find a highly significant, positive correlation between degree of diversification and an ordinal scale for structural complexity. To date such research has been unrelated to the parallel studies of organizational theorists. Results produced in this paper suggest the proposition that as companies diversify and adopt more complex organizational structures, they tend also to structure their activities more, or to become more bureaucratic. Bureaucratic procedures and functional specialization are obvious means to control diverse divisional or subsidiary activities, as has indeed been suggested by some earlier researchers like Channon (1973) but without statistical evidence. The relationship established in this paper between the ordinal scale for structural complexity and formalization, functional specialization, and decentralization provides the missing link. Direct relationships between degree of diversification and bureaucratization will be explored later in a separate paper.

In summary, this first report of the CUBS study: (1) provides support for the main findings of the Aston and National studies; (2) confirms Child's (1973) finding that officeholders are more professionally qualified in bureaucratic organizations; (3) supports Child's (1972) rejection of the Aston finding on centralization and his contention that bureaucracies are marked by decentralization of decision taking; (4) but refines this finding by indicating that such decentralization is of operating rather than of more strategic decisions on marketing or extrabudgetary expenditure; (5) shows that more complex, and in particular multidivisional, structures are more bureaucratic, thereby providing a link with the strategy/structure school.

Some of the statistical analysis of the CUBS data currently being undertaken relates degree of diversification directly to bureaucracy. Other analyses are replicating but extending part of the Aston and National studies on contextual variables. By including further measures of environmental turbulence, and drawing on some of Khandwalla's (1974) scales, it is hoped to relate these separate studies.

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Administrative Turnover as a Response to Unmanaged Organizational Interdependence[1]

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A test was made of the Thompson-Zald hypothesis that succession of leadership is a response to organizational problems. Turnover of university department heads was found to be an interactive function of the paradigm development of the field, the resource interdependence among departmental members, and the turbulence of the historical period of an administrator's headship. The results were interpreted as consistent with the Pfeffer-Salancik theory of organizational control as a mechanism for aligning an organization with its environment.

Turnover of administrators has been studied primarily from a bureaucratic perspective. Administrative change seems more likely for large than for small organizations (Grusky, 1961; Kriesberg, 1962; Gordon & Becker, 1964) and results in fewer subsequent organizational changes, presumably because it is less problematic in large (bureaucratic) organizations where roles are more formalized and less dependent on a single occupant. Although this interpretation accounts for the *ease* of turning over administrative personnel, it does not address the impulse or *reason* for changing administrators.

The issue of removing administrators has been addressed more directly by Grusky (1963). He studied managerial changes in 16 baseball teams

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over 3 decades, observing negative correlations with the teams' win-lose records. Gamson and Scotch (1964) argued that such changes constitute a form of scapegoating: poor organizational performance is attributed to the manager and he is removed. Consistent with this, Pfeffer and Salancik (1977) found the length of a hospital administrator's tenure to be related to the amount of competition faced by the organization for funding and staff, and also to difficulties in the hospital's budget.

A more general approach to administrator succession has been suggested by Thompson (1967) and Zald (1965), both of whom view succession as a response to organizational problems. Zald emphasizes the politics of succession, and Thompson emphasizes the administrator's ascribed role of coping with critical contingencies. When significant organizational problems persist unmanaged, support for the administrator diminishes and separation is more likely, be it voluntary or mandatory. Such a perspective is consistent with finding negative correlations between turnover and organizational performance, suggesting that succession may be adaptive (Helmich & Brown, 1972).

To date, strong empirical tests of the Thompson and Zald view of organizational turnover are unavailable. Existing studies are of unique situations (Zald, 1965; Perrow, 1961) which, by definition, do not contain variation along critical theoretical dimensions. What is required is a comparative study that contrasts organizations with regard to (1) their relative potential for experiencing problems and (2) their relative capacity for coping with those problems. Thompson's (1967) argument suggests that organizations that both face significant uncertainties *and* cannot cope with them should exhibit high levels of administrative turnover.

The present study examined this interaction hypothesis with regard to the turnover of administrators of 20 departments in a single university. The departments were classified according to their relative potential for confronting and coping with organizational interdependencies, and the frequency of turnover during 20 years was examined.

HYPOTHESES AND RATIONALE

Following Thompson (1967), one problem for an organization is resource procurement. For a university department, resources should be problematic as a function of their relative demand and availability. When resources are insufficient, pooled interdependence can cause conflicts over allocating them. The administrator then may be forced to act in ways that dissatisfy some interests, eroding his support.

A second problem for organizations comes from task interdependence. Interdependent tasks require coordination and can create unpredictability and conflict. In university departments, teaching duties become interdependent when courses are prerequisites to others and must be coordinated. An English department can teach a course in eighteenth century poetry nearly independently of a course in twentieth century novels. On the other hand, a psychology department which offers a course in multivariate analysis generally requires a previous course in inferential statistics. Such differences can be characterized as differences in task interdependence.

Task interdependence should affect administrative turnover in the same way as does resource interdependence. The greater the interdependence among the activities of organizational members, the greater the need for coordination and, potentially, the greater the conflict (Pondy, 1966a, 1966b).

The argument that interdependence can increase conflict for a department depends further on whether the organization agrees on the goals and procedures of its work. Resource scarcity would produce little conflict when organizational members would allocate them in the same way. Similarly, task interdependence would present few problems for an organization with clear and agreed upon ideas about how to define and coordinate activities. It is only when individuals disagree about what, or how, tasks are to be done that conflict can be expected.

With respect to consensus, university departments offer a unique site for testing the Thompson-Zald view of turnover. They represent fields of knowledge with varying degrees of consensus. As Beyer (1978) noted, the concept of paradigm development (Kuhn, 1970; Lodahl & Gordon, 1972) expresses the extent to which members of a field share beliefs about the field's problems, content, and procedures. Low paradigm fields agree less about the importance of various content or about the propriety of various procedures (Pfeffer, Salancik, Leblebici, 1976).

A field's paradigm development can directly affect an administrator's ability to cope with interdependence. Departmental decisions involve issues related to a faculty's field of knowledge, decisions about whom to hire, what to teach, whom to promote, whom to graduate, etc. To some extent, the paradigm of a field will be represented by the faculty of a university department. Paradigm development thus can indicate a department's potential for disagreement and, hence, for managing interdependence. The result would be that highly interdependent departments operating in low paradigm fields should experience more conflicts. This discussion can be summarized into three hypotheses:

> *Hypothesis 1: Turnover of department heads will be negatively correlated with the paradigm development of a department. Low paradigm departments will have higher turnover.*
>
> *Hypothesis 2: The greater a department's interdependence in teaching activities, the greater the impact of paradigm development on turnover. The correlation of paradigm and turnover will be larger for high interdependent departments than for low interdependent departments.*
>
> *Hypothesis 3: The greater a department's resource interdependence, the greater the impact of paradigm development on turnover. The correlation of paradigm and turnover will be larger for departments confronting greater resource scarcity than for other departments.*

Implicit in the argument that turnover is a response to unmanaged interdependence is the further assumption that organizations face decisions that expose their conflicts and uncertainties. In this analysis, however, measures on the conflicts or problems of departments are not at hand. Rather, it is assumed the conflicts are reflected in turnover. This is a weak assumption, even if it is necessary, because this study of organizational behavior is a historical one. To strengthen the position, consideration is given to periods in the history of universities when they more readily faced considerable decision making compared to when they did not. Periods of change, for instance, force greater and more intense decisions upon organizations. During expansion, decision making about faculty and course additions could be expected to increase. Similarly, during periods of decline, university departments might be expected to confront more decisions about which programs or courses to drop, and perhaps to take more seriously decisions about which faculty to replace or promote. Accepting these possibilities, a further hypothesis can be made: that the association of turnover with interdependence and paradigm development will be more evident during times of rapid change when decisions are more likely and are problematic.

To summarize the whole argument, *it is hypothesized that changes in department heads will be an interactive function of the interdependence of the department and the shared operating beliefs of its members, evident when decisions are more problematic, as in times of change.*

METHODS AND ANALYSIS

Twenty departments of the University of Illinois at Urbana-Champaign were studied. The sample is similar to one studied by Pfeffer and Salancik (1974), with the exception of the language and humanities departments, excluded because measures of paradigm development and resources were less appropriate for those departments. The 20 departments are listed in Table 1.

For each department, the following measures were obtained: the number of different administrators (department heads or chairmen) in 20 years; the dollar amount of grants to the department; the size of the department; an index of the paradigm development of the field represented by the department; and the proportion of courses in the department that required a prerequisite course. These data were collected from available records as described below.

Turnover

Departmental turnover was defined as the number of different persons occupying the department head position during the period 1954 to 1974. The university has three classifications of department heads: permanent head, acting head, and chairman. The difference between a head and a

TABLE 1
Sample of University Departments and the Fields They Represent (in Parentheses)[a] Ranked According to Paradigm Development

1. Mathematics (Mathematics)
2. Physics (Physics, solid state)
3. Electrical Engineering (Engineering, electrical)
4. Mechanical Engineering (Engineering, mechanical)
5. Chemistry (Chemistry, organic)
6. Civil Engineering (Engineering, civil)
7. Finance (Economics, finance)
8. Psychology (Psychology, general)
9. Architecture (Architecture and fine arts)
10. Economics (Economics, general)
11. Business Administration (Business Administration)
12. Home Economics (Home Economics)
13. Geography (Geography)
14. Accounting (Accounting)
15. Biology (Biology)
16. Anthropology (Anthropology)
17. Geology (Geology)
18. History (History, modern)
19. Sociology (Sociology, general)
20. Political Science (Political Science, general)

[a] Listing in parentheses is field listed in *Dissertation Abstracts International* (1975).

chairman is one of permanence. The chairman is appointed by the faculty for a specific period of time. The head's term is indefinite unless terminated voluntarily or by a two-thirds vote of the faculty. An acting head is appointed when the permanent head is on leave or a new permanent head is being sought. No count was taken of acting heads substituting for a permanent head on leave. Other acting heads were counted, because they are free to take decisions without direction from a returning head, and the designation of "acting" traditionally represents probationary status before bestowing the "permanent" designation.

Data on administrator turnover were obtained from the university archives. The average number of administrators in the 20 departments during the period was 4.2. The range was from 1 to 3 administrators, and the mode was 3.

Grants

To estimate available resources, the total value of grants to a department from outside the university was determined. This measure was used previously (Pfeffer & Salancik, 1974; Salancik & Pfeffer, 1974) and found to indicate the total resources of a department, as it affected both the allocation of general state budget and the allocation of internal funds for graduate and faculty research. The University of Illinois is a graduate-oriented institution with numerous departments having national reputations; research grants are critical for maintaining effective graduate programs.

The dollar amount of grants brought into departments was obtained from budget records for the period of 1958 to 1970. Although these data do not cover the entire period for which turnover data were collected, the year to year variation in the distribution of grants across departments was very small. The average rank correlation from year to year across departments is about 0.8.

Size

Several measures of size seem conceptually relevant: undergraduate and graduate enrollment, faculty size, total budget, and perhaps even the number of distinct courses offered by the department. Budgetary data are intended to reflect the resource variable and thus are unsuitable to measure size as well. Enrollments reflect the demand on the system and thus would seem a better surrogate for problems in the department's task environment. Faculty size also reflects demand on the system because it partly determines the need for resources. Thus, departmental need for resources was estimated as the average rank of departments in faculty size and course enrollment for the period 1958 to 1970.

Resource Interdependence

Because this study is concerned with resource availability relative to size, a resource scarcity index was derived by taking the rank difference between each department's rank on size and rank on grants. This index classifies departments according to their pooled interdependence for resources.

Task Interdependence

The measures of task interdependence used were derived from the structure of course prerequisites: percentage of a department's courses listing at least one other departmental course as a prerequisite. The percentage of courses listing another as a prerequisite reflects the probability that any teaching activity of a department will have to be coordinated with another teaching activity.

Data on the courses offered with prerequisites were obtained from the university course catalogs for the period 1972-1974 and the period 1961-1963. Variation between periods were few. The departments' percentage of courses with prerequisites ranged from 34.4 percent to 98.7 percent, with a mean of 80.0 percent and a median of 72.4 percent.

Paradigm Development

The hardest measure to develop was paradigm development. One common measure depends heavily on evaluations (Lodahl & Gordon, 1972) by academicians about how developed they perceive various fields to be. This measure requires interviewing respondents who are knowledgeable about all of the fields to be rated. To avoid this constraint, an archival measure was used, one designed to reflect the ease and facility of communicating within a discipline. As Beyer (1978), formerly Lodahl, suggested, fields with more highly developed paradigms will have evolved a language system which is shared in the discipline and facilitates communication among members. Less developed fields will have an ambiguous language, one requiring more terms to convey a set of ideas. To measure this feature of paradigm development, the number of words used by dissertation writers to abstract their dissertations was computed. The abstract of a dissertation is particularly attractive as an index because it is a formal requirement of all dissertations listed in the national *Dissertation Abstracts* and it aims to describe the content and findings of a scholar's effort to his field. One would expect scholars from more developed paradigms to communicate the substance of their work more readily and economically than writers from fields with less developed paradigms.

Abstract length, computed from samples of dissertation abstracts published in *Dissertation Abstracts* (1975), ranged from 160.06 words for mathematics to 335.90 words for sociology. The mean across the fields was 285 words.

One problem with estimating paradigm development from national *Dissertation Abstracts* is the imperfect correspondence between the fields categorized by the abstracts and the fields as represented in universities' departments. For example, psychology in the abstracts represents a large component of clinical psychology, a softer, less developed subarea of psychology. The University of Illinois' Department of Psychology, however, tends more toward the quantitative and physiological areas of psychology.

A second measure was taken to reflect paradigms within University of Illinois' departments. This measure is based on course sequencing in departments. Generally, the more shared a paradigm the more easily faculty could relate their areas of knowledge. A faculty that did not agree on the content or interrelations of its courses would be less able to sequence courses into a program for its students. The result would be shorter chains of prerequisites.

For each department, the maximum chaining of courses was determined by counting the maximum number of sequential prerequisite courses that a student had to take before he could take a particular terminal course. Thus, for instance, a course in civil engineering has a prerequisite listed referring to another course and that course has a prerequisite referring to still another course, and so on. There was considerable variation between departments on this chaining measure. The longest chain of prerequisites was 12 for one department, and the shortest was 3 for another department. The mean longest chain length for all departments was 7.77, and the mode was 7.

It might seem that the measure of course chains is similar to the measure of task interdependence described earlier, given that both relate to course prerequisites. They are, however, logically and empirically distinct. The task interdependence measure is the proportion of courses listing any prerequisite. Prerequisites can be listed for organizational reasons independent of knowledge integration, as March and March (1978) noted. A department might ensure that all students take an introductory course (to guarantee enrollments) as a requirement to all other courses in the department. Thus, 100 percent of other courses might list it as a prerequisite. However, for a department to chain a long string of courses into a program requires considerable agreement within the department about the relevance of one knowledge area for another. It requires a very well-developed paradigm, whereas merely listing a single prerequisite does not.

As evidence of the above differences, the chaining measure is significantly more related to the *Dissertation Abstracts*' measure of paradigm (.819; $t(18)=5.69$; $p<.001$) than it is to the task interdependence measure (.472; $p<.05$). The difference is significant ($t(17)=2.33$; $p<.01$) and suggests that chain length mainly reflects a field's paradigm development. Ranks on the course chaining measure, after removing variations attributable to the task interdependence measure, were added to the abstract length ranks to obtain an overall estimate of paradigm development. The rank order of the 20 departments is presented in Table 1.

The validity of the paradigm development rankings was checked by comparing them for seven fields also ranked by Lodahl and Gordon (1972) from their interviews. The correlation between the rankings in this study and those in their is .857; $p<.01$.

RESULTS

Table 2 presents the correlations of turnover with grants, size, task interdependence, and paradigm development. Turnover is positively related to the size of departments ($r=.316$, $p<.10$, one-tailed). Turnover is also negatively correlated with the outside grants of the department; departments with more grant dollars had fewer department heads ($r=-.496$; $t(18)=2.42$; $p<.01$). Turnover, as expected, is also negatively correlated with paradigm development ($r=-.644$). Departments from high paradigm

TABLE 2
Zero-Order Product-Moment Correlations Among Major Variables for all Twenty Departments

	Turnover	*Paradigm*	*Grants*	*Size*
Turnover				
Paradigm development	-.6442			
Outside grants	-.4958	.7623		
Size	.3162	-.0597	.1406	
Task interdependence	.1913	.4117	.5234	.2974

fields made fewer administrative changes ($t(18) = 3.57$; $p < .01$). Task interdependence is not related to turnover ($r = .19$, n.s.).

Although grants and paradigm were related ($r = .76$), an analysis of the partial correlations reveals that the association of paradigm development and turnover is significantly different from zero after controlling for both grants and size ($r = -.413$; $t(16) = 1.82$; $p < .05$, one-tailed). However, the association of grants with turnover disappears after controlling for size and paradigm development.

Resource Interdependence and Turnover

The central thesis here is that turnover is the response of an organization to unmanaged interdependencies. To examine this, the 20 departments were grouped according to their potential pooled interdependence for resources (scarcity). If a department's resources are scarce relative to its staff and work load, interdependence among department members should be greater and turnover should be more associated with paradigm development.

The correlations of turnover with paradigm development for the 10 departments with the most and 10 with the least resource interdependence are presented in Table 3. For high interdependence departments, the correlation of paradigm with turnover is -.805 compared to -.348 for low interdependence departments ($Z = 1.98$, $p < .05$).

TABLE 3
Correlation of Turnover with Paradigm Development for Departments Grouped by High and Low in Resource Interdependence and High and Low in Task Interdependence

	Resource Interdependence	*Task Interdependence*
High	-.805	-.898
Low	-.348	-.577

For high interdependence departments only, the partial correlation of turnover with paradigm, holding grants constant, is -.611 ($t(7) = 2.04$; $p < .05$), one-tailed. The partial correlation of turnover with grants, holding paradigm development constant, is near zero (n.s.). As with the entire sample, the partial analysis suggests that turnover is more related to paradigm than to grants.

Task Interdependence and Turnover

To examine the association of paradigm development with turnover as a function of interdependence, departments were divided into the 10 most and 10 least interdependent and the correlations of turnover with paradigm were computed. The results are also displayed in Table 3.

As expected, turnover is correlated more highly with paradigm development for departments characterized by high interdependence (-.898) than for departments characterized by low task interdependence (-.577). The difference between the correlations of the two groups is significant ($Z=2.14$; $p<.05$).

As a final analysis, the task and resource interdependence measures were combined into a single index, and turnover was regressed against the multiplicative term for paradigm and interdependence, $(P)\times(I)$. Over 70 percent of the between department variance in turnover was associated with this interaction ($p<.01$). An additive combination of paradigm and interdependence accounts for only 54 percent of the variance. Moreover, a multiple correlation analysis that incorporated both factors and their interaction indicated that most of the variance in tenure is associated with the interaction of interdependence and paradigms rather than with their separate effects, with beta estimates of .802 ($P\times I$), -.046 (I), and .139 (P) respectively, accounting for 75.1 percent of the variance in tenure. Indeed, highly interdependent departments with low paradigms averaged 7 department heads in 20 years, compared to 3.27 for all other departments ($F(1,18)=28.57$; $p<.001$).

Historical Periods and Turnover

The analyses above suggest that the administrations of highly interdependent departments with low paradigms are more unstable. This is taken to indicate that administrative change occurs when organizations are unable to coordinate or resolve the conflicts resulting from their interdependencies. This hypothesis has not been demonstrated directly, however, because conflict was not measured. The problem is simply that records are not kept on conflict in this as in most organizations, and indirect analysis must be used.

The argument that administrative succession is a response to unmanaged interdependence suggests that turnover would be greater during historical periods of turbulence or rapid change. Periods of change, whether growth or decline, force a greater number of decisions on organizations, decisions about whom to hire, what to teach, which programs to emphasize, whom to promote. Departments making decisions without the benefit of a shared paradigm would have greater difficulty either in taking actions at all or in taking action with which members agree. The result would be actions by the department head that might dissatisfy members of the department. Thus, as a further test of the argument, different periods can be compared. The turnover associated with the unmanaged interdependence of a department should be concentrated within periods of change.

The years from 1954 to 1974 contained several periods distinguishable as more or less turbulent times for universities. The early 1960s were times of rapid expansion; the late 1960s were times of strife because of an unpopular war and a popular cause for equality; the 1970s were a time of decline and retrenchment. Although the basis for the turbulence differs from period to period, the three periods seem easily distinguished from other periods of more normalcy. Thus, to provide a more cautious test of the Thompson (1967) argument, the 20 years were divided into 2 groups of 10 each, one set labeled "years of turbulence" and the other set "years of normalcy." The years of turbulence were defined as 1959-1963 (for the period of expansion), 1968-1970 (for the war years), and 1970-1974 (for the period of decline). The periods of normalcy were defined as 1954-1959 and 1964-1968.

The effect of these different periods on turnover was examined by, first, computing the probability of a change in administration between any two years for each department. The Thompson argument suggests that turnover will be reflected in the three-way interaction of low paradigm, high interdependence, and turbulent times. To determine whether this interaction accounted for a significant portion of the variance in the probability of administrative change, the following equation was set up:

$$AC_{ij} = a + b(HI)_i(LP)_i(T)_j,$$

where AC_{ij} is the probability of an administrative change in department i during period j. Department i takes the value of each of the 20 departments. Period j is each of the 20 time periods, for example, 1954-55—that is, the period between two years beginning with the year 1954. $(HI)_i$ is a dummy variable coded 1 for high interdependence departments (above the median) and 0 for others; $(LP)_i$ is a dummy variable coded 1 for low paradigm departments and 0 for others; $(T)_j$ is a dummy variable coded 1 for turbulent years and 0 for others. The results of the regression are:

$$AC_{ij} = .114 + .366(HI)_i(LP)_i(T)_j \qquad R^2 = .1103$$

with a significant $F(1,398)$ of 44.44.

The result of this analysis indicates that the probability of an administrative change in any year is four times greater when a highly interdependent department faces a turbulent period and is characterized by a low paradigm (.48 vs. .114). As a check on whether the relationship is interactive, a similar analysis was conducted for the *additive* effects of the same three variables. The additional combination of the three variables accounted for about 6 percent of the variance in administrative change. However, most of the variance accounted for by this formulation is actually due to the overlap of each variable with the interaction term, as can be seen from the results of an analysis incorporating the three factors and their interaction:

$$AC = .05(LP) + .08(HI) + .09(T) + .26(LP)(HI)(T); \qquad R^2 = .112$$

Contributions to AC
Variance 2.10 percent 9.82 percent

Forms of Administrative Positions and Turnover

The analyses above discussed changes in administration without regard to the particular form of the administrative position, headship or chairperson. The head is appointed for an indefinite term unless removed by death, resignation, or a two-thirds vote by the faculty. The chairperson serves for a specific term, usually three years, which can be aborted by death and resignation and extended by a vote of renewal at the end of the term. The department's choice of administrative form is by faculty vote and can be changed at any time.

These different forms can have important implications for the interpretation of the present study, because they potentially affect both governance and tenure. It might be, for example, that administrators turn over more in the low-paradigm/high-interdependence departments because these departments employ a chair form of administration, with more regular passage of the position from individual to individual.

Of course, if high-interdependence/low-paraidgm departments are more likely to opt for chair forms of administration than for headship forms, this would not be inconsistent with the general argument here. Rather, it would suggest that organizations evolve an institutional form appropriate for their situation. They structure the administrative position for easy removal when the potential is high for experiencing problematic conflict.

However, a chair form of administration does not necessarily imply shorter terms for administrators. Indeed, it is quite possible that in departments that face high levels of interdependence, the headship form would result in *shorter* tenures than would the chair form. This, of course, counters an intuitive expectation that heads would serve longer terms because they officially have the position for life. However, the very permanence of the headship may give an occupant the illusory impression that because he is appointed for life he is therefore king. As a consequence, when significant interests clash (as they more likely will in highly interdependent departments), the head makes decisions by executive fiat. If, further, there is no broad consensus in the department (which is more likely in low paradigm fields), such decisions may only accelerate dissatisfaction. With repetition, the faculty and the administrator may become more and more alienated from one another, ending in either forced or voluntary resignations. In contrast, a chairperson mindful of his temporary status and operating in the same problematic environment might proceed with considerably more caution and rely to a greater extent on faculty advisory groups. Although this would not necessarily reduce the residual conflict following decisions, it would effectively keep the chairperson from being associated with the conflict.

Eight of the 20 departments had chairpersons at least once during the 20 years. Altogether, 22 of the 84 administrators had been chairpersons. Only one department maintained a chair form of administration for all 20 years; one other switched from a head form to a chair form; and all others switched from a chair to a head form. Considering the history of all departments, however, the chair form was associated most with the departments that had been identified as highly interdependent. Of the 54 administrators from high interdependence departments, 21 were chairpersons (.389), but only 1 of the 30 administrators from low interdependence departments was a chairperson (.003). The chi-square of the difference in proportions is 12.61, with 1 *df*.

Although it was the case that chair forms of administration were associated with departments potentially facing more problematic conditions, it was not the case that within those departments the chair form had resulted in shorter tenures for administrators. Indeed, the opposite appears to be the case. To examine how the form of administration affected the length of tenure, the various administrations were arrayed in the order of their tenure within departments which had *both* head and chair forms of administration. The restriction to departments having both forms was to ensure that the estimate of the term length associated with form was not confounded with the tenure estimates associated with other particular characteristics of departments. Thus, the analysis addresses the question of whether the seven departments turn their heads over faster than their chairs or vice versa. To give an example of one department, the rank order of tenures for its head (H) and chairs (C) was: C, H, C, H, H. Thus, the chairpersons had shorter terms in five comparisons with the heads and the heads had shorter tenures in one comparison with the chairpersons.

It was found that, in the 7 departments for which comparisons could be made between pairs of administrators classed as either head or chair, in 4 comparisons the chaired person served for a shorter term than the head, in 32 the head served for a shorter term than the chair; and in 12 comparisons the two were equal. If it were true that the chair form of administration leads to shorter terms, then 36 of the 48 comparisons should have shown that, excluding ties. The fact that only four comparisons favored this hypothesis indicates that the hypothesis can be rejected (chi-square = 28.44). A similar analysis with acting heads excluded from the comparisons led to the same conclusion.

The important result of this analysis is that while it is true that the chair form of administration is more likely in highly interdependent departments, it is not true that the chairpersons are changed more than the heads.

CONCLUSIONS

The analysis of turnover in the sample of 20 university departments suggests that turnover of department heads is a function of the organization's capacity for coping with its interdependence. Using resources scarcity and task structure as estimates of department interdependence, it was found that highly interdependent departments from low paradigm fields had more unstable administrations during periods when universities experienced their greatest change in the past two decades.

Several aspects of the present results bear discussion. First, the factors found relating to the turnover of department heads are factors associated with the organization and its context. They are not directly associated with individual characteristics or capacities of administrators. Indeed, about 60 percent of the variance in turnover *across* academic departments was due to just two characteristics of the departments, and another 10 percent was associated with the fortunes of history. This, of course, is a substantial amount of variance and suggests the unpleasant conjecture that the administrator has little control over his fate. Yet, typically, turnover has been studied as a consequence of individual variables, such as age and job involvement (Price, 1977).

The variance unexplained by departmental characteristics, also substantial, may be due to structural features of departments, which in turn, as Meyer (1975) has suggested, may be due to administrative strategy. One implication from the present study is that a highly interdependent organization potentiates conflict, particularly during periods of change. An administrator interested in his own survival might respond to such a situation by "decoupling" the activities of organizational members. In the case of university departments, it should be relatively easy to restrict the extent to which faculty need to coordinate their activities with one another. By organizing curricula and faculty into smaller subsets of relatively homogeneous domains, the level of interdependence might be reduced and the control of the administrator enhanced. Another administrative strategy for dealing with interdependence might be to have minimal information exchange among potentially conflicting parties. Thus, secrecy in organizational decision making may offer another administrative strategy for enhancing control. Future research would be needed to determine if some of the unexplained variance in turnover can be accounted for by administrative structuring of the organizational situation. In addition, future research might examine whether administrative personalities can account for some of the differences.

One possible restriction in interpreting the present results is the distinction between voluntary and mandatory changes in administrators, between leaving and being asked to leave. Clearly the argument developed here implies that structural conditions lead to the removal of an administrator or mandatory turnover. Although information was not available on voluntary versus mandatory change, the distinction is not as critical as it may appear. Voluntary turnover must either make empirical predictions that are inconsistent with the data observed or that are indistinguishable from the predictions of a political response model suggested here. For example, voluntary withdrawal is inconsistent with the data if it is assumed to be associated with either some enduring characteristic of departments or some random factor such as retirement. In contrast, the predictions of voluntary turnover are indistinguishable when such turnover is assumed to be more likely under the problematic conditions created by low paradigm and high interdependence. Ultimately, however, it little matters for Thompson's argument whether an administrative move is forced or self-motivated. In either case, the organization changes its administrator when there is evidence that coping is inadequate. Whether a beleaguered administrator gives up or is forced out would have the same adaptive consequences.

A more interesting limitation to the adaptation interpretation of the present analysis is that successful coping with an organization's problems may itself increase turnover. Achieving success may take such a toll from an administrator that he leaves even after coping. Were this a consistent pattern, and if the successful administrator's action were transitory, the overall effect would be a less adaptive organization. Such an intriguing contradiction, however, is beyond the scope of this paper and requires an analysis of the long-term survival of organizations (Hannan & Freeman, 1977).

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Political Influence: Strategies Employed by Organizations to Impact Legislation in Business and Economic Matters[1]

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This study examines strategies that business lobbyists, consumer groups, unions, and federal agencies employ to shape federal legislation. Interviews with U.S. senators and congressmen preceded a questionnaire survey of 435 chief legislative policymakers. Results reveal that the three major sectors adopt different strategy sets and these strategy sets have varying impacts on the legislative process.

Many of the critical problems plaguing business are the result of changes in external forces and constraints. In response to these pressures corporations have begun devoting extensive resources to external affairs projects, long-range planning, and public relations campaigns. Development of effective strategies for coping with governmental regulation has proven especially perplexing (Weaver, 1977). Formulation of political strategies is complicated by changes in philosophies underlying business-government relations. The transition from a laissez-faire philosophy to one embodying extensive governmental involvement in business decisions is manifest in many ways.

The structures, powers, and orientations of federal agencies clearly demonstrate the magnitude of this transition. Traditionally federal regulatory agencies were industry specific, narrow in scope, lacking in enforcement powers, and concerned primarily with fostering the development of their industry. The Civil Aeronautics Board (CAB) (commercial aviation industry), the Federal Communications Commission (FCC) (telecommunications industry), the Interstate Commerce Commission (ICC) (trucking/highway transportation industry), and the Atomic Energy

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Commission (AEC) (nuclear power industry) were advocates in shaping and nurturing their fledgling technologies. These agencies are all currently experiencing major changes. Recently the AEC was absorbed into the Nuclear Regulatory Commission (NRC), and the CAB has begun to deregulate the airline industry. Unless legislation intervenes, the CAB will cease to exist by January 1, 1985. In addition, deregulation initiatives are likely to occur within both the FCC and the ICC.

In contrast to these earlier agencies, the post-1960 federal agencies have been "issue" oriented versus "industry" oriented. The scope of these agencies and the volume of regulations they produce are unparalleled in U.S. history. Currently the Environmental Protection Agency (EPA) is actively attempting to counter the health effects of pollutants, and the Equal Employment Opportunity Commission (EEOC) is dealing with age, sex, racial, and physical discrimination. Two other powerful organizations, the Consumer Product Safety Commission and the Occupational Safety and Health Administration, are responsible for product and worker safety. Within these contemporary agencies the former nurturing posture has been replaced by an aggressive "enforcement" attitude. This enforcement attitude has led to hundreds of cease and desist orders, civil lawsuits, plant closings, and countless other administrative penalties.

To estimate the economic impact of these agencies would be a major task. At the present time, however, sentiment among legislators, the executive branch, businessmen, and economists seems to attribute inflationary pressures to excessive regulation and compliance costs. This debate remains unresolved. Although the costs of compliance may be difficult to ascertain, the costs of noncompliance have become abundantly clear for some organizations. To illustrate, the volume of automobile recalls in 1978 reached 7.9 million, down from 10.7 million vehicles in 1977 (Guzzardi, 1979). An "equal employment" decree in January 1973 required A.T.&T. to pay $18 million in compensatory wage payments. To remain in compliance with the decree reportedly costs the firm $53 million annually (Loomis, 1979). The Firestone Tire & Rubber Company has been involved in a notable case involving recall of its major radial tire, at a cost that could "easily exceed $300 million" (Louis, 1978, p. 46). Recently EPA ruled that firms proven to have spilled chemicals into waterways could be liable for civil fines up to $5 million, cleanup costs up to $50 million, and possible criminal penalties of one year in jail. Daily accounts of major settlements and penalties involve product safety (including hair dryers, children's toys, microwave ovens, and aerosols), worker safety (exposure to noxious and toxic substances), employment practices (discriminatory hiring and promotion systems) and especially environmental contamination (radiation leakages, chemical wastes, acid-rain, surface mining practices, and chemical spills in transit).

The challenge facing organizations may potentially overwhelm their capacity to respond. An indication of the problem was Sears, Roebuck's recent class-action suit filed against EEOC. In its action it was asserted that "as the employer of 420,000 people, [it was unable] to comply simultaneously with all the affirmative-action directives it faces" (*Fortune*, 1979, p. 20). The current legislative apparatus and enforcement organizations pose a monumental problem for business strategists. The political clarity and certainty of earlier years has disappeared as issues and positions have become increasingly complex and interrelated (Ladd, 1979).

Surprisingly, despite the widespread recognition of the effect of governmental regulation on business, relatively few academicians have specifically examined strategic implications and responses to emerging legislative conditions. The present situation provides an opportunity to observe a fascinating power struggle between organizations and their environments. Organizational theorists have been examining the ways in which organizations adapt to these pressures, but this is only one part of a reciprocal relationship. Theorists have seldom dealt with the efforts of organizations to exert "control" or domination over their legislative environments. McNeil also recognizes this predilection and concludes:

> . . . while both adaptation and domination strategies are used in large scale organizations; most organizational sociologists, seeing no sinister plot to dominate, focus solely on the adaptation strategies (1978, p. 66).

As McNeil implies, the failure to consider the joint and independent operation of the adaptation-domination process could lead to faulty models of the organization-environment relationship. There would appear to be two compelling reasons for further investigation of this phenomenon. First, the failure to understand domination may lead to oversimplistic models of organizations and, second, the practical importance of improving business-government relationships is apparent in a democratic society.

The present study was initiated in recognition of the theoretical and practical importance of the issue. Specifically, this article examines the nature of domination and influence strategies adopted by the major actors in the legislative process. In addition, the impact of these strategies is evaluated. The study assesses one possible theoretical framework in the context of the 95th Congress.

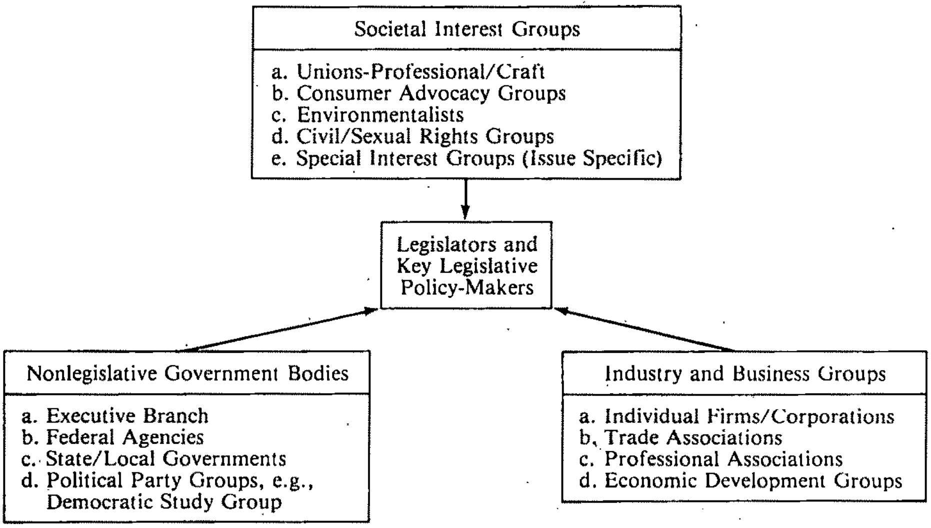
ACTORS IN THE POLITICAL INFLUENCE PROCESS

Federal governmental bodies affect the activities of countless organizations and individuals as they frame legislation to ameliorate economic and social ills. Consequently, any proposed legislation or action of these bodies is of paramount concern to various sectors of society. America's tradition of political pluralism aggravates this situation by permitting all segments of society to voice their opinions (Parsons, 1969). Pluralism inevitably produces conflicts between groups and individuals striving to achieve mutually exclusive objectives. As an example, efforts of manufacturers to minimize operational and product costs may be diametrically opposed to groups or agencies seeking simultaneously to improve product quality and worker safety and prevent environmental degradation.

The legislative arena provides the forum wherein these groups vie for power and control. To achieve their goals these individuals and organizations exert intense pressure on legislators, key policymakers, legislative assistants, and standing committees of Congress. Their lobbying efforts assume many forms and involve the expenditure of millions of dollars annually.

To reduce this process to manageable proportions, a number of simplifying assumptions are required. First, one can assume that most individual constituents, despite their ultimate control over election outcomes, play a limited role in shaping legislative policy. This assumption seems warranted given the difficulty a single constituent may have in successfully gaining an audience with a legislator (MacMillan, 1978). In addition, modern legislative proposals are a complex of technical and regulatory jargon that may not be understood by a nonexpert. The second assumption is that individual constituents, especially when vitally affected by a proposed action, will form coalitions to organize their efforts and concentrate their power (MacMillan, 1978). If it is assumed that the wishes of individual constituents will be most effectively communicated through various interest groups, the political influence process can be reduced to the three distinct sectors shown in Figure 1

FIGURE 1
Actors in the Legislative Influence Process


Societal Interest Groups
a. Unions-Professional/Craft
b. Consumer Advocacy Groups
c. Environmentalists
d. Civil/Sexual Rights Groups
e. Special Interest Groups (Issue Specific)
Legislators and Key Legislative Policy-Makers
Nonlegislative Government Bodies
a. Executive Branch
b. Federal Agencies
c. State/Local Governments
d. Political Party Groups, e.g., Democratic Study Group
Industry and Business Groups
a. Individual Firms/Corporations
b. Trade Associations
c. Professional Associations
d. Economic Development Groups

The three major sectors, industry and business groups, societal interest groups, and nonlegislative governmental bodies, frequently oppose each other on specific pieces of legislation. Although generalizations are risky, certain philosophical stances are traditionally associated with the views and actions of each sector. Industry and trade association representatives normally oppose changes (this includes both increased *and* decreased regulation) in legislation or policy that would impact their products or operations. They are particularly adamant in opposing regulatory intrusion into internal decisions, defending these as historical "rights" of management. Unions and environmentalists, two societal interest groups, commonly espouse expanded governmental involvement and active agency enforcement. They rely on legislative action to enhance their power vis-a-vis business. Various nonlegislative governmental groups, notably federal agencies and executive branch officials, also are extremely active in shaping federal legislative direction. Unfortunately, it is more difficult to categorize the influence philosophy of this sector. At times agencies may aggressively advocate broadened enforcement powers and expanded budgets. Other times, although rare, an agency may attempt to reduce its regulatory power and resources. The variation in this sector undoubtedly reflects broader changes in political attitudes in society.

The strategies these sectors employ to influence legislation have obvious implications for the eventual success of the group's overall lobbying effort. A choice of strategy logically would depend on the power bases available to an organization. Political power bases should provide the foundation for strategy choice.

BASES OF POLITICAL POWER AND INFLUENCE

French and Raven (1959) have demonstrated the usefulness of power bases in clarifying social influence processes. They described five semiautonomous power bases—reward, coercion, legitimacy, referent, and expertise—and explained the ways agents utilized these bases to influence behaviors of focal persons. The logic of the power bases concept transfers easily to the political influence process, but specific components of French and Raven's bases appear limited to social influence situations.

Political influence processes involve the interactions of multiple groups possessing very limited control over the direct reward structures of the focal persons (legislators). In the political process conflicting groups are simultaneously attempting to influence the focal person's attitude and position. Moreover, political influence emphasizes the indirect application of financial resources to strategic choices. The illegality of direct financial inducements enables one to concentrate primarily on the indirect application of these financial resources.

Finer (1955) proposed that a corporation's (organization's) political power could be assessed in terms of five factors: (1) the organization's ability to mobilize action and resources (organization); (2) the amount of disposable funds for lobbying (riches); (3) organizational access to key influentials (audience); (4) the ability of the organization to make employees committed to goals and strategies (dependence); and (5) the ability of the organization to create or alleviate economic problems in society (surrogateship). To Finer's model, Epstein (1969) adds corporate influence over media, historical political successes of business, and the public stature of business executives.

Unfortunately, French and Raven's (1959) model has not been examined within political contexts. Moreover, neither the model proposed by Finer nor the Epstein additions have been empirically tested. The difficulties encountered in operationalizing these concepts may have limited empirical efforts. One possible approach is contained in the work of Parsons (1969) and the refinements recently presented by MacMillan (1978).

Using Parsons's typology of modes and channels, the distinctions between social and political influence processes become evident. The Parsons's framework also clarifies the differences between power and influence, the latter being of prime concern in legislative processes. Parsons's view of power presupposes an ability of the agent to effect situational changes. He emphasizes the ways an agent can directly alter situational reward contingencies to effect behavioral change. This direct control seldom is present in political influence settings, but it is commonly observed in social interactions. MacMillan, in interpreting Parsons, defines influence as: "the capacity of that actor (agent) to restructure the *perceptions* of the opponent (focal person) so as to get the opponent to act as desired" (1978, p. 15). Therefore, the concept of influence does not require an actor to manipulate outcomes directly, only the perceptions of the attractiveness of alternative outcomes. These latter changes more nearly correspond to political influence and are implemented in the intentional channel described by Parsons (1969).

Modes of action taken by the influencing agent may be construed as either positive or negative. Negative modes may produce the desired effect but may reduce the satisfaction of the focal person. Positive modes also may produce desired behaviors, but they tend to increase focal person satisfaction. Four manipulation strategies, and their relationship to Parsons's modes and channels, are reflected in Figure 2.

FIGURE 2
Techniques for Effecting Change in Focal Persons

		Channel	
		Situational	Intentional
Mode	Positive	Inducement	Persuasion
	Negative	Coercion	Obligation

Organizations attempting to influence legislators or key policymakers characteristically operate in the intentional channel and employ both persuasion (positive) and obligation (negative). A study of political influence therefore can examine these two strategy types and capture the essence of the process.

Integration of the bases of power with Parsons's typology of manipulation strategies leads to a number of assertions. Given the differences in constituents, goals, and power bases, organizations in the political influence process will be limited in the strategies they can select. Furthermore, these organizations will tend to rely on various strategies in distinct patterns. It was hypothesized:

H1: The three major influence sectors (business, society, and nonlegislative government) will not employ significantly different strategies to produce changes in legislation and legislative action.

Influence strategies should be perceived as having varying impacts on the legislative process. Parsons's modes of influence would imply that positive modes would be more successful than negative modes. Hypotheses 2a and 2b incorporate these implications:

H2a: Influence methods will not have significantly different impacts on the legislative process.

H2b: Positive modes of influence will not produce significantly greater impacts on the legislative process than will negative modes.

METHOD

The initial phase of study involved exploratory interviews with six chief legislative assistants. These interviews served as a pretest for a structured questionnaire and as a control against possible omission of critical factors. After this phase, questions were revised and an interview format was prepared.

During the second phase, 36 senators, congressmen, and key legislative assistants in the 95th Congress participated in one-hour interviews. Interviews were conducted jointly and independently by the researchers. Information produced in this phase provided a basis for the development of a survey instrument to examine influence techniques and their impacts. Four influence strategies emerged: strategies based on information; strategies relying on public exposure and appeals; strategies employing direct power; and strategies depending on political pressure. Interviewees identified 12 techniques as being "most commonly" utilized by groups attempting to influence legislative action. The 12 techniques are associated with the four strategy types as reflected in Table 1. The survey instrument was structured to examine directly the usage and impact of these 12 techniques. It also was prepared in the lexicon of the legislative environment to increase the likelihood that respondents would understand the items posed.

The population surveyed in the final phase consisted of 435 chief legislative assistants in the U.S. House of Representatives during the 95th Congress (Summer 1978). These chief assistants are registered in the *1978 Congressional Staff Directory—Advance Locator for Capitol Hill.* Legislative assistants were chosen as the target group because their positions place them in a "gatekeeping" role on legislative matters. They normally are

TABLE 1
Categories of Influence Strategies and Specific Techniques Employed to Influence Legislation

	Category of Strategy			
	Information	*Public Exposure/Appeal*	*Direct Pressure*	*Political*
Method of Influencing	Expert witness Personal visit Providing specific argument Technical reports	Publishing voting record Third party influence Letter campaign Media campaign	Threat of harm Financial support	Constituent contact Colleague contact

responsible for framing proposed legislation, evaluating bills, attending important committee sessions, and generally advising their congressional sponsor on major floor and committee decisions. In addition, time demands on the elected official make it virtually impossible for him/her to permit a personal audience with all influence groups. Consequently, the chief legislative assistant becomes the focal person for corporations, interest groups, and lobbyists hoping to influence proposed congressional actions.

Demographic questions preceded the items on influence techniques. To determine the impact of influence techniques, individuals were asked to rate each of the 12 techniques on a scale ranging from a "very negative impact" (scale value = -10) to a "very positive impact" (scale value = $+10$). The middle point (scale value = 0) was described as "having little or no impact." The negative values were included because the interviews in the second phase indicated that some influence methods may produce an effect opposite to that intended. A cover letter explaining the study and the background introduced the survey to the legislative assistants.

RESULTS

Responses were received from 159 legislative assistants (36.6 percent). Eight respondents reported that their staff had a policy of not participating in research studies. Six questionnaires were not usable for various operational reasons. The remaining 145 responses represented a usable response rate of 33.3 percent.

Demographic summaries revealed that the legislative assistants were a highly educated group, with 96 percent having college degrees and 38 percent having graduate degrees (primarily law degrees). Length of service was relatively short, with the mean amount of congressional service being less than five years. Responses were received from assistants associated with 40 different states. The 10 states not represented had small legislative delegations (all less than 5 representatives). Representation of political parties nearly equalled that of the total House. Of the respondents, 65 percent were Democratic; the remaining 35 percent were Republican. In the

95th Congress the distribution was 66 percent Democratic and 34 percent Republican.

All of the influence techniques earlier identified emerged as major ways the different sectors attempted to shape legislation. The first hypothesis proposed that the three key sectors would adopt significantly different strategies. Table 2 reports the frequency of observations for the four strategy types. Chi-square analysis revealed that the three sectors do employ significantly different influence strategies ($\chi^2=273.3$, $p<.001$, $d.f.=6$). Consequently, the first hypothesis was rejected.

TABLE 2
Use of Influence Strategies by Type of Influence Sector[a]
($N=145$)

	Influence Sector			
Influence Strategies	*Societal Interest Groups*	*Industry and Business Groups*	*Nonlegislative Government Bodies*	*Strategy Totals*
Information	522[b] (661)	658 (656)	533[b] (396)	1,713
Public Exposure/Appeal	459[b] (347)	394 (344)	46[b] (208)	899
Direct Pressure	154 (146)	143 (145)	82 (86)	379
Political	187 (167)	116 (166)	130 (100)	433
Group Totals	1,322	1,311	791	3,424

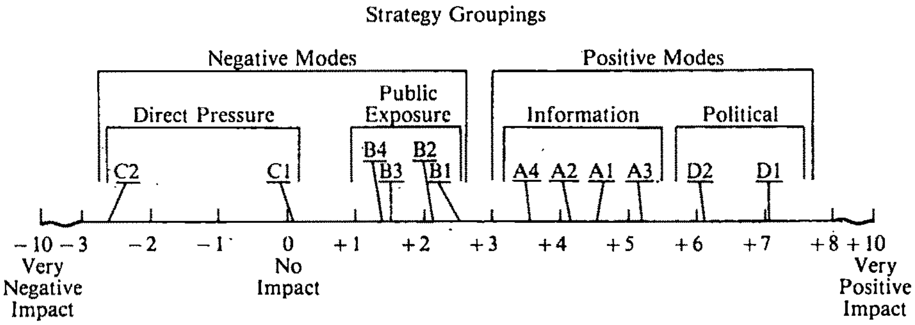
[a] Numbers in parentheses are expected cell values.
[b] Major deviations between expected and actual values.

Information-based influence attempts were utilized more extensively than any other approach, being initiated nearly twice as frequently as public exposure and appeals. Industry groups were especially inclined to employ an information-based strategy. Nonlegislative governmental bodies also made greater use of information than was expected, and they seldom used public appeals or public exposure to influence legislative action. In contrast, societal interest groups extensively utilized public exposure and appeals. Societal groups also tended to make greater use of politically based strategies.

Respondents rated the perceived impact of each influence technique on a 20-point scale. The four strategy groups clustered in distinct sets, with political strategies having the most positive impact, followed by information and public exposure strategies. Strategies based on direct pressure were perceived as producing a negative impact (-1.28) on key legislative policymakers (Figure 3).

Given a within subjects repeated measures design, the test for significant differences yielded an F-value$=107.14$ ($p<.001$, $MS_e=9.42$). Consequently, Hypothesis 2a was rejected. It was concluded that the influence techniques did vary in their perceived impact on the legislative process.

FIGURE 3
Perceived Impact of Influence Strategies and Techniques



A. Information (4.39)[a]		
Expert Witness	A1	(4.65)[b]
Personal Visits	A2	(4.13)
Specific Arguments	A3	(5.15)
Technical Reports	A4	(3.62)

B. Public Exposure/Appeal (1.91)		
Voting Record	B1	(2.57)
Third Party Influence	B2	(2.12)
Letter Campaign	B3	(1.56)
Media Campaign	B4	(1.38)

C. Direct Pressure (-1.28)		
Threat of Harm	C1	(.09)
Financial Support	C2	(-2.65)

D. Political (6.58)		
Constituent Contact	D1	(7.05)
Colleague Contact	D2	(6.10)

[a] Strategy group averages.
[b] Value = perceived impact. Scale ranged from − 10 to + 10.

TABLE 3
Influence Strategy Group Mean Absolute Error Differences

	Negative Modes		*Positive Modes*	
	Direct Pressure	*Public Exposure/ Appeal*	*Information Based*	*Political Based*
Direct Pressure	—	3.19*	5.67*	7.86*
Public Exposure/Appeal		—	2.48*	4.67*
Information			—	2.19*
Political				—

*$p < .01$

Further analysis of strategy group differences was required to evaluate Hypothesis 2b. Using Scheffe's post hoc multiple comparison procedure, it was revealed that the four strategy groupings differed significantly from each other ($p < .01$). Hypothesis 2b was therefore rejected. Table 3 reports the absolute differences in means of the positive and negative strategy modes. The two positive groups, political and information based, have a significantly more positive impact than do public exposure and direct pressure.

DISCUSSION

Strategic responses to political pressures generally lead to either accommodative actions or attempts to manipulate the situation (MacMillan, 1973). The ability of an organization to manipulate a focal person is in direct proportion to its power bases and influence techniques. The role of information in influencing political action is clearly apparent. Corporations, societal groups, and other governmental bodies use information-based strategies as their major techniques for influencing legislative proposals. Potentially information-based strategies may overload the information processing capacity of the legislative apparatus and the legislators alike.

Politically based strategies implicitly rely on coalitions of influence sectors and key constituents or other legislators. Ultimately the internal power a congressman possesses relies upon being reelected and gaining assignment to prestigious House committees. Committee assignment is controlled internally by political mechanisms. Failure to cooperate with or to impress fellow congressmen is not likely to enhance one's chances for increased responsibility. Influence groups that operate through constituents or colleagues could directly effect eventual outcomes to the congressmen. It therefore is not surprising that these strategies have the great impact on legislators.

Union groups have historically used political appeals (namely, through committees on political education) as one influence strategy. Recently corporations have recognized the potential of these "grassroots" campaigns. In recognition, corporate political action committees (PACs) have blossomed from 89 in 1974 to over 525 in 1978. These committees, comprised of volunteer employees in the corporation, seek to promote the election of "desirable" candidates and to foster legislative action conceived as more "favorable" to the corporation. These PACs are likely to spread as politically based strategies demonstrate their effectiveness.

Societal interest groups gain much of their power because of their fiduciary relationship with a broader cross section of society (Curry & Wade, 1968). Unlike the industry and governmental sectors, much of their power arises from their ability to energize the members of their union or group and to focus attention on an issue. The frequent use of public exposure/appeal strategies therefore is consistent with the power bases prediction. Moreover, because a federal agency normally does not have resources for media campaign or a vocal constituency, it seldom employs this type of strategy.

The results of this effort have demonstrated the tendency for the three major influence sectors to adopt unique strategy sets. Diversity of missions, structures, resources, and constituents leads to different power bases for each sector. Rationally, these actors should seek consistency between their political strengths (power bases) and the actions they take to influence legislative action. One factor that should modify this strategic choice is the perceived impact of an influence technique.

Parsons's (1969) typology of manipulation channels and modes suggested that positive modes of influence would produce desired actions in a focal person and generally be associated with more satisfaction with outcomes. This relationship therefore was hypothesized here. The results confirmed the superiority of positive modes. Information (4.39) and political (6.58) strategies had a significantly more positive impact than did the public exposure/appeal (1.91) and direct pressure (-1.28) strategies. Attempts at persuasion (positive mode-intentional channel) appear to be preferable to attempts that create a sense of obligation (negative mode-intentional channel).

IMPLICATIONS

One of the major challenges facing democratic societies is the incorporation of the conflicting goals and views of its citizens into legislative action and public policy. A free society allows its members to interact with political bodies and political figures and thereby attempt to influence or shape legislation. Given a complex society of many actors and coalitions, the variety of potential influence strategies becomes immense. Moreover, in this political environment it is likely that certain influence strategies would be more effective than certain other influence strategies. The goal of this study has been to determine the extent of usage of various influence strategies and to evaluate their relative impact on the legislative process. Based on the results of this study, organizations may want to examine their current political influence strategies to insure that their strategic choice does not unconsciously impede their ability to shape legislative action.

Results indicate that various organizations tend to rely on a limited set of influence approaches. Their usage patterns undoubtedly reflect variations in underlying power bases of the different organizations. A potential fruitful area for future study might focus on the integration of power bases and strategic influence choice. Moreover, does the impact of a strategy depend on the interaction of organization and strategy? In other words, would an information-based strategy have more impact when employed by a government influence group than by a labor union? Similarly, could a government influence group effectively employ a direct pressure strategy, while a corporation might find direct pressure would have a negative impact?

Sociologically oriented studies of this nature are particularly helpful in pointing out future directions or identifying important questions. Questions to be considered in the future may include:

—Do political influence strategies, like products, demonstrate "life cycle" characteristics?

—Are political strategies situationally specific, or are there generic types that have broader applicability?

—Does the content or scope of a proposed legislative action mediate the impact of an influence strategy?

It is hoped that the future refinement of political influence strategies will enhance the theoretical and practical understanding of business-government relationships.

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Generalizability of the Vertical Dyad Linkage Model of Leadership[1]

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The validity of the Vertical Dyad Linkage model of leadership was tested under conditions differing substantially from those investigated in past research on the model. In over 90 percent of the units in this study, supervisors formed different quality relationships with their subordinates. Subordinates reporting high quality relationships with their supervisors assumed greater job responsibility, contributed more to their units, and were rated as higher performers than those reporting low quality relationships.

One of the major characteristics of the contemporary leadership literature is the assumption that leaders manifest one consistent leadership style. Trait theories (Stogdill, 1948; Ghiselli, 1963; Bradford & Lippitt, 1945), behavioral approaches (Fleishman, Burtt, & Harris, 1955; Likert, 1961; Katz, Maccoby, & Morse, 1950), situational models (Fiedler, 1967), and path goal theory of leadership (House, 1971; House & Mitchell, 1975) all average subordinate perceptions of the leader when classifying a leader's style.

One of the few leadership theories that clearly does not assume that leaders enact a single leadership style with all subordinates in their units is the Vertical Dyad Linkage (VDL) Model (Dansereau, Graen, & Haga, 1975; Graen & Cashman, 1975). Graen and his colleagues have found that in nearly all units leaders differentiate among their subordinates in terms of leader behavior. According to this theory, certain subordinates chosen because of (a) competence and skill, (b) extent to which they can be trusted (especially when not being watched by the supervisor), and

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[1] The authors express their appreciation to the administrators and the participants in this longitudinal study and acknowledge the data collection by Thomas Johnson, the research assistance of James Cashman, Joan Graen, and William Schiemann, and the reading of earlier drafts by Steve Green and Timothy Serey. This research was sponsored in part by a National Institute of Education grant to George Graen.

(c) motivation to assume greater responsibility within the unit are given preferential treatment by the leader. These selected subordinates (in-group members) make contributions that go beyond their formal job duties and take on responsibility for the completion of tasks that are most critical to the success of the unit. In return, they receive greater attention, support, and sensitivity from their supervisors. Subordinates who are not chosen by the supervisor (out-group members) perform the more routine, mundane tasks of the unit and experience a more formal exchange with the supervisor.

In addition, a group falling between these two extreme types of leader-member exchange (the middle group) has been identified in more recent research by Graen and Cashman (1975). This exchange trichotomy (in, middle, out) is used for analysis in this study. Graen and his associates have found that leaders usually differentiate among subordinates, probably in an attempt to obtain acceptable performance from the unit. The leader is responsible for the unit's output. He or she alone is not capable of executing all important aspects of the unit's function and therefore delegates some of these more critical tasks to those subordinates who can perform them well. Because poor unit performance would be a bad reflection on the leader and could affect his/her future in the organization, the leader naturally does not want subordinates who cannot be trusted to work on critical tasks.

Thus, to study leadership in organizations, the assumption that all subordinates are treated alike by the supervisor (average leadership style) may be replaced with an approach that centers on the analysis of each supervisor–subordinate dyad. Empirical evidence supporting the propositions of the VDL model has been provided by the Dansereau et al. (1975) study and replicated and extended by the research of Graen and Cashman (1975). Despite the strength in the findings of the VDL model in the initial study and replication, two issues raised by these investigations require further study. First, research on the VDL model has involved samples of managerial employees exclusively. Although the model is frequently nondescriptive at the lowest level of an organization (foreman-worker) due to nature of tasks and relationships and the lack of resources necessary in developing unique exchanges, the model's validity for the second level (manager–foremen) is an empirical question. Foremen generally are concerned with supervision of the day-to-day execution of a number of tasks, most of which need to be performed over and over in a cyclical fashion. Unlike managers, foremen are less involved in long-range planning, and do not have control over resources (e.g., the budget) for their units. In light of these differences it is not known if supervisors would differentiate among foremen as they do with managers. Second, would independent researchers replicate the results using the same methods and procedures as in the earlier studies? The present investigation has been designed to address these issues. Independent investigators, using the same methods as in past research on the VDL model, conducted research on service departments with a sample consisting of approximately equal numbers of managers and foremen.

METHODS

Setting

The setting for the present investigation matched that of the earlier studies in several respects. First, the sample was drawn from service departments of a public university. Second, the organizations also were tied to the academic calendar, which resulted in most activity occurring between the end of August and the beginning of June. Third, although entire managerial hierarchies could not be included, the entire hierarchical chain of those dyads sampled was included. One difference between the present setting and that of the earlier studies was that the earlier studies were performed within a large university, but the present study was performed in a medium sized university (19,000 students). Another difference, one that will be concentrated on in this study, is that the earlier studies dealt exclusively with managerial and some clerical employees, but nearly half of the sample in the present investigation is made up of foremen.

Participants

The sample was composed of leader-member dyads from three semi-autonomous service departments, which included residence hall services, physical plant operations, and a student union. Eleven managers and 4 foremen were sampled in residence hall services, 15 foremen and 6 managers in physical plant operations, and 5 managers from the student union. Altogether, 41 dyads were included in the investigation.

Procedure

The 41 dyads were assessed on three separate occasions, each separated by three months. (A longitudinal design was desired so that stability of results could be checked. Greater confidence can be placed in the findings when similar results are obtained at more than one point in time.) Unfortunately, due to interview time constraints, not all variables were assessed at all three time periods. Table 1 presents the time periods at which each set of variables was assessed. All participants in the study were interviewed with respect to their own job situations (focal interviews). In addition, the supervisors of these participants were interviewed three times about each of their subordinates (supervisory interview). Superiors of the heads of the three organizations studied received only supervisory interviews; the lowest level people were interviewed only as focals; and people of all levels between the highest and lowest level (including organization heads) were interviewed as both focals and supervisors. The items in the supervisor interviews were mirrored images of the focal interview items. For example, in

TABLE 1
Matrix of Data Collected

	Time of Assessment		
Instrument	T_0	T_1	T_2
1. Structural and demographic variables	X		
2. Independent variables			
A. Vertical exchange (negotiating latitude) scale	X	X	
B. Job type (managers and foremen)	X		
3. Work activities			
A. Focal report of own activities	X	X	X
B. Supervisor report of focal activities	X	X	X
4. Perceptual measures			
A. Focal perceptions			
1. job needs	X	X	X
2. interpersonal sensitivity	X	X	
3. willingness to contribute	X	X	
B. Supervisor perceptions			
1. job needs	X	X	X
2. interpersonal sensitivity	X	X	
3. willingness to contribute	X	X	
5. Outcome variables			
A. Performance (supervisor appraisal)			X
B. Focal view of own job problems	X	X	X
C. Supervisor view of focal job problems	X	X	X
D. Job satisfaction of focal	X	X	

the focal interview the question, "How often do you take suggestions regarding your work to your supervisor?" was mirrored in the supervisory interview to read "How often does John Doe bring suggestions regarding his work to you?" It is important to note that subordinates of foremen employees did not participate in the study. Thus, foremen were analyzed in terms of their relationships with supervisors and not with regard to how they deal with subordinates.

The first assessment (T_0) was a pretest designed for the refinement of data collection instruments. Results of the pretest (T_0) will not be reported with the exception of demographic variables (collected only at T_0) and for use in calculating reliability for variables not collected at the final time period.

Instrumentation

Information was collected on five sets of variables: structural and demographic measures, independent variables, work activities, perceptual measures, and outcome variables.

VARIABLES

Structural and Demographic

The purpose of collecting structural and demographic information was twofold. First, this information was used to analyze the effects of differential organizational status and/or personal characteristics upon the nature of the dyadic relationships. Second, these measures were used to analyze the selection criteria used by supervisors to differentiate unit members into one of the exchange relationships. In addition, the demographic variables were used to detect differences between foremen and managers. These variables include information about the participants' age, race, sex, number of dependents, education, membership in professional organizations, and number of subscriptions to professional publications. Structural variables assessed included job title—groupings of similar job descriptions; tenure—measured for department, position, and dyad (time working for the same supervisor); level—from head of each organization to lowest level (this included four levels for physical plant and residence hall services and three levels for the student union); and span of control—number of subordinates in a supervisor's unit.

Independent

Vertical Exchange (negotiating latitude)—This is the measure used to sort the dyads into leader-member exchange quality groups (in, middle, and out). The four items making up the negotiating latitude measure were (1) How flexible do you believe your supervisor is about evolving change in your job? (2) Regardless of how much formal organizational authority your supervisor has built into his position, what are the chances that he would be personally inclined to use his power to help you solve problems in your work? (3) To what extent can you count on your supervisor to "bail you out," at his expense, when you really need him? (4) How often do you take your suggestions regarding your work to your supervisor? The response alternatives for the first item were: supervisor is enthused about change, he is lukewarm about change, he sees little need to change, he sees no need to change. The second and third items had the following response alternatives: he certainly would, he probably would, he might or might not, and not at all. The final item had the following response alternatives: almost always, usually, seldom, never. The four items were summed for each participant, and the distribution for the entire sample was trichotomized (as close to 1/3 splits as possible) reflecting the quality of the exchange (in, middle, and out). Cashman and Graen state that:

> The interpretation of the two extremes (the in and out exchange groups) follows that of Jacobs (1970) and Dansereau, et al. (1975). Leadership (in exchange) according to these authors involves the influence of members by superiors without resort to the authority derived from the employment contract. Supervision (out exchange) involves the influence of members through the exercise of contractual obligations. The intermediate group (middle exchange) share some of both of these methods of influence. For this group, the influence of members involves partial reliance upon interpersonal exchange and partial reliance upon contractual obligations (1977, p. 3).

Work Activities

Work activity measures were designed to assess each member's allocation of time across a set of 23 activities. Each activity was assessed from

TABLE 2
Test-Retest (Three Months) Reliability Coefficients

Measure	*Reliability Coefficient*
Leader-member exchange (negotiating latitude)	.75
Work activities:	
Managing	.58
Boundary spanning	.62
Administrative decision making	.78
Planning	.71
Liaison	.60
Job needs:	
Assurance	.77
Information	.57
Support	.56
Interpersonal sensitivity:	
Work sensitivity	.70
Self determination	.47
Personal sensitivity	.65
Willingness to contribute	.62

the viewpoint of both supervisors and members. For each activity each member was asked to report his current time involvement in terms of four possible responses ranging from "none" to "considerable." Supervisors also were asked to respond to this activity list. They reported the amount of time that they felt was spent by each subordinate on each activity. These responses also could range from "none" to "considerable." The 23 items making up the work activities scale were reduced to 5 factors derived from factor analytic results from previous studies using the work activities scale. Scale scores (rather than factor scores) were used to construct the factors. Activities broke down into managing, boundary spanning, administrative decision making, planning, and liaison. The instrument was administered at each time period to focals and their supervisors. For further details, see Dansereau et al. (1975) or Cashman (1975).

Perceptual

Perceptual information, collected across several dimensions, included job needs, interpersonal sensitivity, and willingness to contribute. Each of these scales was administered to both leaders and members. For validity and reliability information, see Graen and Cashman (1975).

Job Needs—This measure assessed the amount of attention (personal involvement in decisions, assurance of confidence), information (performance feedback, role clarity, interest in details of work), and support (consider and implement suggested changes, backs up work) that members reported receiving from their supervisors. Responses range from "almost none" to "a great deal." The nine original items were reduced to attention, information, and support with factor analytic results from previous research on the model (Cashman, 1975). Scale scores were used to derive the factors. Leaders were asked to report how much they provided each member.

Interpersonal Sensitivity—This instrument assessed the extent to which the supervisor was sensitive to each subordinate's (1) personal needs: know where you stand, supervisor understands your problems and recognizes potential; (2) work situation: help of supervisor, lets me know what is expected; and (3) self determination: the extent to which a member had autonomy in defining and changing the job for him/herself.

The measure is made up of three main factors: work sensitivity, self-determination, and personal sensitivity. Focals were asked how much sensitivity they received from their supervisor and also were asked for their perceptions of how much self-determination was allowed by the leader.

Willingness to Contribute—The extent to which a member was willing to give extra time and effort when needed was measured with this instrument. Supervisors were asked for their perceptions of how willing members were to do this.

Outcome

Employee Rating Scales—This instrument (Graen, Dansereau, & Minami, 1972) was used to assess the supervisor's evaluation of the performance of each unit member. The aspects of performance evaluated included: dependability, alertness, planning, know-how and judgment, overall present performance, and expected future performance. These items (scaled 1 = unsatisfactory to 7 = outstanding) were summed to create an overall performance rating.

Job Problems—This measure (Dansereau et al., 1975) assessed the degree to which 21 separate job problems affected focal persons. Each person's report on each item could range from "not a problem" to "a major obstacle." The supervisor of each member also reported the degree to which each item represented a problem to each subordinate.

Job Satisfaction—The Role Orientation Index (Graen et al., 1972) was used to assess each unit member's attitude toward the work and the supervisor. The format for this instrument is an adjective checklist similar to the Job Descriptive Index (Smith, Kendall, & Hulin, 1969).

Analyses—Negotiating latitude was trichotomized (as close to 1/3 splits as possible) into an in, middle, and out group, and job type was divided into managers and foremen. This produced a 3 × 2 design. Because the cell sizes of this design were not equal (ranging from 3 to 11, smallest to largest), multivariate analysis of variance (Finn, 1976; Bock, 1963) was employed. This procedure is based on regression techniques rather than unweighted means, and thus performs an accurate analysis even with unequal cells. Multivariate analysis of variance (MANOVA) is also desirable because it controls for Type I error by providing an overall *F* test covering any group of univariate tests specified by the user (Finn, 1976). MANOVA (overall) *F*'s were calculated for each set of dependent variables on both main effects and interactions. The effect of time also was analyzed.

Because negotiating latitude was trichotomized, a significant main effect merely indicates that there is a difference between the groups. It does not specify exactly where the difference occurred. Thus, a protected t-test analysis was executed to test the in>middle>out hypotheses for all dependent variables demonstrating significant univariate F's. The significant univariate F has been shown in Monte Carlo simulations to control for Type I error among the a priori t-tests and is preferred over Tukey, Newman-Keuls, Scheffe, and Bonferroni post hoc analysis (Carmer & Swanson, 1973; Lewis, 1976).

RESULTS

Independent Variables

Leader-Member Exchange—The statistical properties of this measure are of critical importance, for this variable taps the construct of leader-member exchange. Prior research devoted much effort to validation of the construct. Negotiating latitude was measured with two different methods from the perspective of leaders, members, and peers (Graen & Cashman, 1975). The resulting multimethod-multisource matrix (based on Campbell & Fiske, 1959) showed high agreement (convergent validity) among leaders, members, and peers with both methods utilized. Thus it could safely be concluded that neither method nor source variance was overwhelming the negotiating latitude measure. In the present investigation it was decided that it would not be necessary to repeat the construct validation procedure of the earlier research in its entirety. Validity was determined by looking at agreement between members and their supervisors on negotiating latitude. The correlation between the two views was .46 ($p<.01$), which approximates the .50 obtained in the previous study. Negotiating latitude also was found to be relatively stable over three months, as reflected in correlations (between T_0 and T_1) of .75 for member reports and .72 for the superiors' views.

An analysis of the T_1 distribution of in, middle, and out group dyads among the 12 organizational units sampled resulted in the finding that 11 (or 92 percent) of the 12 units included members of 2 or more different exchange groups. (T_1, rather than T_0, was chosen to cut the sample into in, middle, and out groups as none of the T_0 data will be presented. It should be noted that the pretest data yielded nearly the same exchange trichotomy.) In other words, only one unit was found to be made up exclusively of members of the same exchange group. Thus, just as in past studies, it was found that most leaders form different relationships with each unit member (subordinate). Only one supervisor in the present study did not differentiate among subordinates (and his unit contained only two members).

In addition, it is important to note that both manager and foreman level units consisted of members reporting different exchange relationships with their superiors.

Job Type—The sample consisted of 22 managers and 19 foremen. The breakdown of managers into the three levels of leader-member exchange was 11, 8, and 3 managers, respectively, for the in, middle, and out groups. Among foremen there were 7 in, 5 middle, and 7 out group members. There were no promotions of foremen to managerial ranks during the course of the study. Thus job type showed complete stability over time.

Demographic and Structural Variables

Demographic and structural variables are important to check for the possibility that effects reported as differences in leader-member exchange are actually due to some underlying structural or personal characteristic variable. A one-way analysis of variance on structural variables showed no differences between exchange groups. No differences were found across departments (organizations) or levels. None of the personal characteristics were significantly different between exchanges except life cycle, which deals with the ages of children. Significant differences were found between managers and foremen on age, education, and professionalism. Managers in the sample were more educated and more professionally oriented as expected. Also, as expected, managers were found to be younger than foremen.

Work Activities

The items used to measure work activities dealt with the amount of time members consumed in various job activities. Members with higher levels of exchange reported spending more time on administrative decision making and communication (boundary spanning and liaison) activities than did those low in negotiating latitude. In addition, high exchange members reported that they spent more time managing than did their low exchange counterparts. Confidence in these univariate tests is increased by the significance ($p < .02$) found in MANOVA (overall) F's for both T_1 and T_2. The protected t-tests for exchange pinpointed the significance as occurring between the in and out groups on boundary spanning, administrative decision making, and liaison, and also between the middle and out groups on decision making (Table 3).

Although managers reported spending more time on boundary spanning, decision making, planning, and liaison activities, they did not report spending more time managing (Table 4). None of the tests for interactions on any of the five activities approached significance. The lack of interactions is important for it demonstrates that despite significant differences between managers and foremen on activities, the differences between exchange groups follow similar patterns for both managers and foremen.

Supervisors' evaluations of the amount of time they thought each subordinate was spending on the same five activities resulted in significant differences across exchange on managing, boundary spanning, and decision

TABLE 3
Involvement in Work Activities by Leader-Member Exchange
(Focal View)

	Time One					Time Two					
	In *(N=18)*	*Middle* *(N=13)*	*Out* *(N=10)*	*P*	*Contrast*	*In* *(N=18)*	*Middle* *(N=13)*	*Out* *(N=10)*	*P*	*Contrast*	*Time*
Managing	12.22	12.62	10.70	.13		12.78	11.62	10.60	.04	I>O	.05
Boundary spanning	12.39	11.31	9.70	.04	I>O	12.67	10.92	10.60	.07	I>O	.07
Administrative decision making	11.22	11.31	8.40	.01	I>O, M>O	10.94	11.38	8.70	.01	I>O, M>O	.01
Planning	15.94	15.77	15.60	.90		16.50	16.08	15.80	.60		.90
Liaison	9.39	9.08	7.20	.01	I>O, M>O	9.11	8.62	7.60	.07	I>O	.02
MANOVA *P*[a]				.02					.02		

[a] MANOVA *P* gives the probability for the multivariate (overall) *F* for the above set of variables. Contrasts were tested with protected *t*-tests at the $p < .05$ level on all variables with significant univariate *F* ratios. *P* indicates the probability of the univariate *F* for each variable.

TABLE 4
Involvement in Work Activities by Job Type
(Focal View)

	Time One			Time Two				Exchange × Job Type[a]		
	Managers *(N=22)*	*Foremen* *(N=19)*	*P*	*Managers* *(N=22)*	*Foremen* *(N=19)*	*P*	*Time*	*T1*	*T2*	*Time*
Managing	12.50	11.37	.30	12.27	11.42	.47	.09	.88	.88	.90
Boundary spanning	13.18	9.32	.01	12.73	10.32	.01	.01	.32	.74	.33
Administrative decision making	11.91	9.00	.01	11.86	9.00	.01	.01	.43	.81	.62
Planning	16.64	14.84	.01	16.68	15.63	.10	.01	.10	.31	.30
Liaison	9.97	7.58	.01	9.18	7.89	.05	.17	.35	.30	.15
MANOVA *P*[a]			.01			.01		.36	.32	

[a] MANOVA *P* gives the probability for the multivariate (overall) *F* for the above set of variables. *P* indicates the probability of the univariate *F* for each variable.

TABLE 5
Job Needs Received by Leader-Member Exchange
(Focal View)

	Time One					Time Two					
	In *(N=18)*	*Middle* *(N=13)*	*Out* *(N=10)*	P	*Contrasts*	*In* *(N=18)*	*Middle* *(N=13)*	*Out* *(N=10)*	P	*Contrasts*	*Time*
Attention received	17.72	16.08	14.50	.03	I>O, M>O	17.83	16.46	14.70	.03	I>O	.08
Information received	10.17	9.00	8.10	.09		9.67	8.08	7.90	.10		.17
Support received	14.56	12.77	11.90	.01	I>O, M>O	15.11	13.69	12.30	.02	I>O	.02
MANOVA P^a				.06					.08		

[a] MANOVA P gives the probability for the multivariate (overall) F for the above set of variables. P indicates the probability of the univariate F for each variable. Contrasts were tested with protected t-tests at the $p < .05$ level on all variables with significant univariate F ratios.

TABLE 6
Job Needs Received by Job Type
(Focal View)

	Time One			Time Two				Exchange × Job Type[a]		
	Managers *(N=22)*	*Foremen* *(N=19)*	P	*Managers* *(N=22)*	*Foremen* *(N=19)*	P	*Time*	*T1*	*T2*	*Time*
Attention received	16.86	15.89	.66	16.86	16.37	.91	.75	.58	.19	.26
Information received	8.68	10.00	.03	8.18	9.73	.06	.06	.87	.36	.72
Support received	14.27	12.26	.03	14.59	13.26	.26	.09	.83	.74	.95
MANOVA P^a			.02			.12		.88	.38	

[a] MANOVA P gives the probability for the multivariate (overall) F for the above set of variables. P indicates the probability of the univariate F for each variable.

making. Once again, the overall MANOVA F was significant at T_1 and T_2. Protected t-test showed a great deal of similarity between focal and supervisor reports of time spent on activities across exchange groups. Supervisor reports also agreed with the focal reports that managers spend more time on each of the activities than do foremen. Unlike the focal viewpoint, however, the supervisor reports of time spent on activities showed a significant interaction between exchange and job type on boundary spanning. This interaction showed that out group managers spend less time boundary spanning than do in or middle group managers, and out group foremen consume about the same amount of time as in and middle group foremen.

Perceptual Measures

Job Needs—Members of high exchanges reported that they received more attention and support from their supervisors (Table 5).

Protected t-tests on attention and support showed significant differences ($p < .05$) between in and out groups at both T_1 and T_2. At T_1, foremen reported receiving more information but less support than did managers (Table 6).

Although supervisors agreed with focals as to the amount of attention given across exchange groups, supervisors did not report giving more information and support to high exchange subordinates. Similarly, leaders did not report differences between managers and foremen on the amount of job needs that they gave.

Interpersonal Sensitivity—A significant MANOVA F ($p < .001$) showed that high exchange focals reported receiving greater supervisory sensitivity than did those of lower leader-member exchange. Although the overall MANOVA F was significant, only personal sensitivity was significant at the univariate level. Virtually no differences occurred between manager and foreman perceptions of sensitivity received from the supervisor.

Willingness to Contribute—Members reporting higher exchanges with their supervisors reported a greater willingness to contribute to the unit (Table 7). Supervisors agree with this report, although they perceive middle group members as contributing most to the unit, as shown in the protected t-tests. On job type, focal and supervisor reports did not agree;

TABLE 7
Unit Contribution, by Leader-Member Exchange

	In *(N=18)*	*Middle* *(N=13)*	*Exchange* *Out* *(N=10)*	*P*[a]	*Contrasts*
Focal view	5.67	5.15	4.50	.05	I>O
Supervisor view	7.22	7.77	6.20	.001	I>O, M>O, M>I

[a] P indicates the probability of the univariate F for each variable. Contrasts were tested with protected t-tests at the $p < .05$ level on all variables with significant univariate F ratios.

managers did not indicate that they contribute more than foremen, but the supervisors felt that managers do contribute more to the unit than foremen.

Outcome Variables

Performance—Performance was measured from the supervisor's view only. The differences between exchange groups on overall performance were significant ($p < .01$).

The protected *t*-test showed the in ($\bar{x} = 34.22$) and middle ($\bar{x} = 36.00$) groups to be significantly different from the out group (28.30) on job performance. Although the mean for the middle group was larger than that for the in group, the protected *t*-test did not produce a reliable difference between the two groups ($p < .35$). Because negotiating latitude was collected at T_1 and performance was measured at T_2, leader-member exchange has been shown to be predictive of future performance evaluation. Finally, it was found that supervisors do not appraise the performance of managers and foremen differently.

Job Problems—In past research on the VDL model, both members and their superiors have reported more problems with supervisory practices among low exchange members than among those with higher levels of leader-member exchange. In the present investigation, however, no significant differences were found across exchange groups for supervisory practices or any of the other problems at T_1 or T_2 from the point of view of focals or supervisors. The means for these variables were very low, as was the variance (indicating the near absence of severe job problems).

Satisfaction—Means on satisfaction with the intrinsic value of the work itself, and satisfaction with the supervisor's technical competence and interpersonal relations, were not found to differ among exchange groups. Satisfaction scores were very high with little variance.

In summary, findings regarding work activities, job needs, interpersonal sensitivity, willingness to contribute, and performance were very similar to results of past VDL research. Results on the job problems and satisfaction measures showed less sensitivity to leader-member exchange differences than usual.

DISCUSSION

The results show quite clearly that, as with managers, foremen are very much aware of the kind of relationship or exchange that they have with their supervisors and the resulting kinds of discretion and latitude that they may exercise in their jobs. This is not to say that there are no differences between managers and foremen. Foremen, primarily concerned with routinized daily operations, do not report spending as much time as do managers on decision making, interunit coordination, or liaison activities.

Foremen also report receiving less support but more information (regarding job duties, authority, and day-to-day assessments of job performance) from their supervisors. This may suggest that foremen are being regimented or supervised more closely than are managers. This coincides with House, Filley, and Gugarati's (1971) suggestion that role information sent from the supervisor might be viewed by managers as showing good managerial feedback and clear unambiguous role demands, but with foremen it could be construed as a manifestation of closer supervision and a loss of job autonomy.

It appears that the above difference between managers and foremen reflects differences between the types of jobs involved, not the characteristics of the people. For example, despite lower mean involvement by foremen on decision making, boundary spanning, and liaison activities, foremen of high exchange dyads reported spending more time on these activities than did those with exchanges of lower quality. Both foremen and managers high in negotiating latitude were found to be rated as higher performers than were those reporting less negotiating latitude. Similarly, quality of exchange was strongly related to an employee's inclination to volunteer for special assignments and to be asked to do extra work in busy situations. Although these findings are very similar to earlier managerial studies of the VDL model, there now is evidence indicating that the model is also appropriate for analysis down to the foreman level.

For purposes of construct validation, it also is important to reiterate that this data collection was conducted by independent researchers in a different geographic area than was past research on the model. In the present study conducted in three different service departments of a medium sized university, with a sample consisting of both managers and foremen, it was found that supervisors do indeed differentiate among their unit members. The kind of relationship that is built between the supervisor and a subordinate has a great impact on the kinds of activities that the subordinate performs. Members who have high quality exchange with their supervisors carry out tasks that go beyond the written job description. These people have been selected by the supervisor because she/he feels that they can be trusted in dealing with responsibilities going beyond the formal employment contract. A nonwritten interpersonal contract seems to be negotiated between the leader and the preferred subordinate(s).

In the present investigation, the interpersonal contract for higher exchange people involved more activity in communicating with members of other units and more involvement in public relations and direct contact with clients. This informal contract for high exchange people also was found to consist of greater participation in making administrative decisions. In essence, people of high quality dyads were given greater responsibility. The greater amount of job-related feedback, support of actions, and personal sensitivity (understanding of the person's problems and needs, and awareness of his/her abilities and potential) received by high exchange members may be interpreted as the supervisors' way of rewarding the extra effort of these "preferred subordinates." Thus, the results of this study indicate that supervisors of foremen differentiate among subordinates in a fashion similar to that of supervisors of managerial level members. Therefore, at the foremen level, it is not appropriate to describe the leader's style by using the averaging model. Rather the leader-member exchange between that supervisor and each subordinate should be approached as unique. Unit differentiation by leaders has important implications with regard to task delegation, team building, and unit functioning. It also has been shown to have an impact on employee attitudes toward the job. Quality of dyadic exchange also appears to be a critical underlying variable with respect to other important outcomes, such as performance and turnover.

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A Three Sample Test of Some Extensions to the Job Characteristics Model of Work Motivation[1]

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Two theoretical extensions to the Hackman and Oldham (1976) job characteristics model of work motivation describe: (1) the relationship between job scope and psychological response as curvilinear, and (2) growth need strength as moderating the curvilinear relationship. Data from three samples supported only the first extension to the model.

An earlier paper (Champoux, 1978a) proposed two extensions to the Hackman-Oldham job characteristics model of work motivation (Hackman, 1977; Hackman & Oldham, 1976). The first extension described a curvilinear relationship between job scope and psychological response to the job. The rate of increase in psychological response was not considered to be strictly positive-linear as described by the theory. Rather, the rate of increase in psychological response was viewed as decreasing as jobs increased in scope. Jobs especially broad in scope could produce decrements in response. The curvilinear relationship, therefore, could take the shape of an inverted U.

Justification for the curvilinear extension can be found in activation theory (Scott, 1966) and the theoretical analysis of Schwab and Cummings (1976). Activation theory indicates that the relationship between activation level and performance may be curvilinear (Scott, 1966). Jobs broad in scope may be sources of excessive stimulation, producing decrements in performance and attitudes. Furthermore, the theoretical analysis of Schwab and Cummings (1976) is cast partly in curvilinear terms and

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includes the possibility of inverted U relationships. The absence of concern for curvilinearity in job design research has been noted by Pierce and Dunham (1976).

The job characteristics theory of work motivation includes growth need strength as an important moderator of psychological and behavioral response to jobs. Individuals with strong growth needs are expected to respond more positively to jobs of broad scope than are individuals with weak growth needs.

The second extension to the theory also views growth need strength as an important moderator affecting the curvilinear relationship between job scope and psychological response. Individuals with strong growth needs will experience a smaller decrement in the curvilinear relationship between job scope and psychological response than will individuals with weak growth needs. People with strong growth needs possibly can be "stretched" further by their jobs than can people with weak growth needs. This extension to the model can be considered a corollary to the view that people with weak growth needs may be stretched too far by jobs broad in scope (Hackman, Oldham, Janson, & Purdy, 1975).

The results of the earlier study supported only the first extension to the theory. They suggested that the response to enriched jobs does indeed taper off for jobs of considerable scope. The implications of these findings seemed to be important for job redesign efforts.

Although the second extension to the theory received no support from the data, it has important implications for job design. Consistent with the Hackman-Oldham model, the job scope-psychological response relationship still will be strongest for individuals with strong growth needs even when the basic relationship is curvilinear.

Because both extensions to the model appear to bear important implications for the basic job characteristics model as well as job redesign efforts, it was believed important to test these extensions in additional samples. This paper reports the results of tests of these extensions to the theory in three samples not reported in the original paper (Champoux, 1978a).

METHOD

Questionnaire Instrument

Data were obtained with either the short form or the long form of the Job Diagnostic Survey (Hackman & Oldham, 1975). The Job Diagnostic Survey (JDS) was selected for this research because it was used in the original study (Champoux, 1978a). Furthermore, it was specifically developed from the job characteristics model of work motivation and has been used in all of the basic research done with this model (Hackman & Oldham, 1974, 1975, 1976). The use of this instrument in the present study permits an extension of that line of research without introducing differences due to difference in measurement.

The JDS provides measures of several job dimensions, growth need strength (GNS), and a number of affective responses. A full description of the JDS is available from other sources (Hackman & Oldham, 1974, 1975).

Hackman and Oldham (1974, 1975) have recommended that the motivating potential score (MPS) be calculated from the job dimensions as an index of the overall motivating quality of a job. The formula for calculating MPS assumes empirical distinction among the five core job dimensions. Previously reported factor analyses of the job dimensions measured by the JDS have not shown consistent distinction among the core job dimensions in different samples (Dunham, 1976; Dunham, Aldag, & Brief, 1976; Pierce & Dunham, 1978).

Separate factor analyses were performed on the JDS job dimension items for each of the present samples. A four factor solution was found for each sample, with skill variety and autonomy forming one factor. The same result was reported for the factor analysis performed in the earlier study (Champoux, 1978a). For all of the foregoing reasons MPS was not used in the analysis. Instead, a measure of job scope was constructed from the simple sum of the five core job dimensions.

Data Collection and Description of Samples

R&D Organization—A mail-out-mail-back procedure was used to obtain data from employees of a research and development (R&D) organization using the short form of the JDS. Complete details of the data collection method and a demographic profile of the final sample are available elsewhere (Peters & Champoux, 1979). It should be noted that the R&D organization reported here is *not* the same R&D organization from which data for the earlier study were obtained (Champoux, 1978a).

A brief analysis of data from the present R&D sample has been reported in Peters and Champoux (1979). That analysis was intended to focus on some issues in the context of making job redesign decisions. The issues were illustrated with an analysis of a single affective response variable. The present analysis not only is concerned with the substantive theoretical issues raised earlier, but it also includes two additional affective response variables.

Federal Agency—A—Data were obtained from two separate groups in a federal agency operating in a western state. Both groups of employees were informed by memorandum from agency management of the general nature of the study. Their cooperation was encouraged, although it was made clear to them that participation in the study was voluntary. Assurances of confidentiality of their questionnaire responses were extended. These data originally were collected as part of a field experiment in job redesign (Champoux, 1978b).

The data for sample A from the federal agency were obtained with the long form of the JDS from the experimental group one week prior to experiencing changes in jobs. A member of the agency staff working with the researcher personally gave the questionnaire to each individual and collected it at a later time. Verbal reminders were given approximately one week later to those who delayed returning their questionnaires. Some individuals declined to participate in the study or simply failed to return their questionnaires. The response rate was 94 percent.

Almost 60 percent of the sample were males, 34 percent were under the age of 30, 16 percent were between the ages of 30 and 39, and 50 percent were age 40 or older. Of the sample, 47 percent held at least a bachelor's degree, and 39 percent held professional positions such as engineers, geologists, and economists; 38 percent held clerical positions; 17 percent were in administrative positions; and 6 percent were technicians or draftsmen.

Federal Agency—B—The data for the second sample from the federal agency were taken from the first administration of the questionnaire to the control or comparison group that did not experience any of the job changes. These data were obtained with the short form of the JDS.

Questionnaires were mailed by the researcher to 178 employees. Completed questionnaires were returned directly to the researcher at the university. After one follow-up, questionnaires were returned by 167 employees for a response rate of 94 percent.

Approximately 89 percent of the sample were males, 39 percent were under the age of 30, 30 percent were between the ages of 30 and 39, 31 percent were over age 40, and 66 percent held at least a bachelor's degree. The jobs held by the individuals in the sample fell into three broad job groups: professional (64 percent), technical (27 percent), and clerical (6 percent).

Intercorrelations and Reliabilities

The intercorrelations among the JDS variables and the coefficient alpha reliabilities are shown in Table 1. With the exception of growth satisfaction, the intercorrelations are moderate and of approximately the same magnitude in each sample. The coefficient alpha reliabilities indicate that the JDS variables have good internal consistency. The one exception is internal work motivation in the R&D sample with a coefficient alpha of .63.

Data Analysis

The method of data analysis employed in the present study was developed initially in the context of job redesign decisions (Peters & Champoux, 1979). The detailed logic of the regression analysis has been described fully in the earlier study concerned with the two extensions to the job characteristics model of work motivation (Champoux, 1978a).

The following regression equation was hierarchically evaluated:

$$\hat{y} = a + b(\text{Job Scope}) + c(\text{GNS}) + d(\text{Job Scope} \times \text{GNS})$$
$$+ e(\text{Job Scope}^2) + f(\text{Job Scope}^2 \times \text{GNS})$$

TABLE 1
Intercorrelations and Reliabilities of the JDS Variables[a]

	R&D Organization (N=1198)					*Federal Agency—A (N=66)*					*Federal Agency—B (N=161)*				
Variable	*1*	*2*	*3*	*4*	*5*	*1*	*2*	*3*	*4*	*5*	*1*	*2*	*3*	*4*	*5*
1. Job scope	(.84)					(.84)					(.85)				
2. Growth need strength	.23	(.89)				.07	(.91)				.17	(.87)			
3. General satisfaction	.49	.07	(.74)			.41	.12	(.78)			.62	−.09	(.77)		
4. Internal work motivation	.36	.17	.34	(.63)		.42	.15	.51	(.70)		.49	.16	.44	(.73)	
5. Growth satisfaction	.65	.10	.72	.40	(.86)	.65	.03	.74	.57	(.84)	.72	−.02	.77	.55	(.90)

[a]Entries in the diagonal are coefficient alpha reliabilities.

The first line of the equation contains the basic job characteristics model, including the moderating effect of growth need strength. The second line contains the terms for each of the two extensions to the model.

A separate hierarchical multiple regression analysis was performed on the three affective response variables (general satisfaction, internal work motivation, and growth satisfaction) obtained from the JDS. The terms in the regression were evaluated separately according to the hierarchical procedures described in Cohen and Cohen (1975). (The analysis just described involves the interrelationships among a person's perceptions and attitudes. This raises the question of whether the results here will be due merely to common method variance and response consistency. It is felt that the relationships being examined are sufficiently complex that the results to be described cannot be attributed to either of these factors.)

RESULTS

Table 2 shows the results of the hierarchical multiple regression analysis. The basic moderating effect of growth need strength appeared for various affective response variables in all three samples. When the Job Scope × GNS term entered the regression, statistically significant increments in R^2 for general satisfaction occurred in the R&D sample and the sample from Federal Agency—A. For internal work motivation and growth satisfaction, a significant improvement in the R^2 from the addition of the interaction term occurred in the R&D sample and Federal Agency—B.

The predicted curvilinear relationship between job scope and psychological response received considerable support from the data. The introduction of the Job Scope^2 term into the regression produced statistically significant increments in R^2. This occurred in two samples for general and growth satisfaction and in one sample for internal work motivation.

The data provided no support for the second extension to the theory. The introduction of the term representing this extension (Job Scope^2 × GNS) produced no significant increments in R^2 in the three samples for any of the affective response variables.

Other data from the regression analyses are described in the remainder of this section. Only the significant regressions noted above are discussed.

Basic Job Characteristics Model

The basic job characteristics model was expressed by the regression

$$\hat{y} = a + b(\text{Job Scope}) + c(\text{GNS}) + d(\text{Job Scope} \times \text{GNS}).$$

The nature of the interaction of GNS and job scope in determining the regression of the affective response variables on job scope is easily seen after rearranging the terms of this regression. The rearranged regression equation is

TABLE 2
Results of the Hierarchical Multiple Regression Analysis

Variable Entered	R&D Organization (N=1198)				Federal Agency—A (N=66)				Federal Agency—B (N=161)			
	Cumulative R^2	Increment to R^2	F	df	Cumulative R^2	Increment to R^2	F	df	Cumulative R^2	Increment to R^2	F	df
					General Satisfaction							
Job scope	.244	.244	385.588***	1/1196	.165	.165	12.641***	1/64	.384	.384	98.967***	1/159
GNS	.246	.002	3.298	1/1195	.173	.008	.648	1/63	.425	.041	11.373***	1/158
Job scope × GNS	.252	.006	9.108***	1/1194	.240	.067	5.446**	1/62	.427	.002	.631	1/157
Job scope^2	.256	.004	7.852***	1/1193	.254	.014	1.140	1/61	.445	.018	4.925**	1/156
Job scope^2 × GNS	.257	.001	1.085	1/1192	.254	.000	.003	1/60	.450	.005	1.312	1/155
					Internal Work Motivation							
Job scope	.133	.133	183.630***	1/1196	.175	.175	13.529***	1/64	.239	.239	50.027***	1/159
GNS	.142	.009	12.173***	1/1195	.189	.014	1.118	1/63	.245	.006	1.158	1/158
Job scope × GNS	.146	.004	5.168**	1/1194	.190	.001	.063	1/62	.254	.009	1.927	1/157
Job scope^2	.159	.013	19.781***	1/1193	.190	.000	.017	1/61	.256	.002	.378	1/156
Job scope^2 × GNS	.161	.002	2.451	1/1192	.214	.024	1.868	1/60	.262	.006	1.249	1/155
					Growth Satisfaction							
Job scope	.423	.423	877.972***	1/1196	.426	.426	47.405***	1/64	.524	.524	175.278***	1/159
GNS	.426	.003	5.356**	1/1195	.426	.000	.031	1/63	.546	.022	7.713***	1/158
Job scope × GNS	.440	.014	29.794***	1/1194	.435	.009	1.064	1/62	.557	.011	3.853*	1/157
Job scope^2	.446	.006	13.275***	1/1193	.436	.001	.034	1/61	.589	.032	12.154***	1/156
Job scope^2 × GNS	.446	.000	.541	1/1192	.436	.000	.000	1/60	.590	.001	.072	1/155

*$p < .06$
**$p < .05$
***$p < .01$

$$\hat{y} = [a + c(\text{GNS})] + [b + d(\text{GNS})]\text{Job Scope}.$$

It can be seen that the slope (coefficient of job scope) of the regression of an affective response variable on job scope is a linear function of GNS.

Standardized slope coefficients or betas (Cohen & Cohen, 1975) for five selected values of GNS are shown in Table 3 for general satisfaction, internal work motivation, and growth satisfaction for the R&D organization; general satisfaction for Federal Agency—A; and growth satisfaction for Federal Agency—B.

TABLE 3
Standardized Slope Coefficients from Regressions of Affective Response Variables on Job Scope Basic Job Characteristics Model[a]

	R&D Organization			*Federal Agency—A*		*Federal Agency—b*	
GNS	*General Satisfaction*[b]	*Internal Work Motivation*[c]	*Growth Satisfaction*[d]	*GNS*	*General Satisfaction*[e]	*GNS*	*Growth Satisfaction*[f]
4.81	.42	.29	.52	5.01	.67	5.16	.60
5.39	.46	.29	.59	5.55	.54	5.64	.66
5.84	.49	.35	.63	5.99	.42	6.02	.73
6.30	.53	.35	.70	6.43	.29	6.40	.76
6.88	.56	.40	.78	6.97	.17	6.88	.83

[a] The levels selected for GNS would represent the 16⅔, 33⅓, 50, 66⅔, and 83⅓ percentiles of GNS if that variable were normally distributed.

[b] $\text{Slope} = (.0222 + .0202\ \text{GNS}) \times (4.2048/1.1921)$.

[c] $\text{Slope} = (.0000 + .0100\ \text{GNS}) \times (4.2048/.7285)$.

[d] $\text{Slope} = (-.0011 + .0301\ \text{GNS}) \times (4.2048/1.1338)$.

[e] $\text{Slope} = (.4769 - .0634\ \text{GNS}) \times (4.4532/1.0703)$.

[f] $\text{Slope} = (-.0362 + .0421\ \text{GNS}) \times (4.0555/1.2257)$.

In the samples from the R&D organization and Federal Agency—B, the slopes at the higher GNS levels are substantially larger than those at the lower GNS levels. These larger slopes indicate a steeper regression line for individuals with high GNS than for individuals with low GNS. The individuals with strong growth needs did respond more positively to jobs of greater scope. Furthermore, the rate of increase in affective response as job scope increases was greater for high GNS than for low GNS people.

The slope coefficients for Federal Agency—A, however, contrast sharply with those from the other two samples. The coefficients at the higher GNS levels are *smaller* than those at the lower GNS levels. The magnitude of the slope coefficient at $\text{GNS} = 6.97$ indicates little relationship between job scope and general satisfaction for individuals in this sample with the strongest needs for growth.

Curvilinear Extension

The curvilinear extension to the basic job characteristics model was expressed by the regression

TABLE 4
Standardized Slope Coefficients from Regressions of Affective Response Variables on Job Scope Curvilinear Extension—R&D Organization[a]
($N = 1,198$)

	General Satisfaction[b] *Job Scope*					*Internal Work Motivation*[c] *Job Scope*					*Growth Satisfaction*[d] *Job Scope*				
GNS	*22.95*	*25.22*	*27.03*	*28.83*	*31.10*	*22.95*	*25.22*	*27.03*	*28.83*	*31.10*	*22.95*	*25.22*	*27.03*	*28.83*	*31.10*
4.81	.46	.42	.39	.32	.28	.35	.29	.17	.12	.06	.56	.52	.45	.41	.37
5.39	.53	.46	.42	.39	.32	.40	.29	.23	.17	.06	.63	.59	.52	.48	.45
5.84	.56	.49	.46	.42	.35	.40	.35	.29	.23	.12	.70	.63	.59	.56	.48
6.30	.60	.53	.49	.46	.39	.46	.40	.29	.23	.17	.74	.70	.63	.59	.56
6.88	.63	.60	.53	.49	.46	.52	.40	.35	.29	.17	.82	.78	.70	.67	.63

[a] The levels for GNS and job scope would represent the 16⅔, 33⅓, 50, 66⅔, and 83⅓ percentiles of these variables if they were normally distributed.

[b] Slope = (.1634 + .0239 GNS − .0064 Job Scope) × (4.2048/1.1921).

[c] Slope = (.1457 + .0137 GNS − .0066 Job Scope) × (4.2048/.7285).

[d] Slope = (.1496 + .0340 GNS − .0070 Job Scope) × (4.2048/1.1338).

$$\hat{y} = a + b(\text{Job Scope}) + c(\text{GNS}) + d(\text{Job Scope} \times \text{GNS}) + e(\text{Job Scope}^2).$$

Rearrangement of the terms of this regression emphasizes the way in which the interaction of GNS and job scope, as well as the degree of job scope, influence the regression of an affective response variable on job scope. The rearranged regression equation is

$$\hat{y} = [a + c(\text{GNS})] + [b + d(\text{GNS}) + e(\text{Job Scope})]\text{Job Scope}.$$

This equation shows that the slope (coefficient of job scope) of the regression of an affective response variable on job scope is a function of *both* GNS and job scope.

The curvilinear extension to the basic job characteristics model was supported in the samples from the R&D organization and Federal Agency—B. Standardized slope coefficients from the statistically significant regressions in these two samples are shown in Tables 4 and 5.

TABLE 5
Standardized Slope Coefficents from Regressions of Affective Response Variables on Job Scope Curvilinear Extension—Federal Agency—B[a]
($N = 161$)

	General Satisfaction[b] *Job Scope*					*Growth Satisfaction*[c] *Job Scope*				
GNS	*23.30*	*25.49*	*27.23*	*28.98*	*31.17*	*23.30*	*25.49*	*27.23*	*28.98*	*31.31*
5.16	.69	.54	.47	.36	.25	.73	.56	.46	.33	.17
5.64	.72	.58	.51	.40	.29	.79	.66	.53	.40	.26
6.02	.76	.62	.54	.43	.33	.86	.73	.60	.46	.30
6.40	.76	.65	.58	.47	.36	.93	.79	.66	.53	.36
6.88	.83	.69	.62	.51	.40	1.03	.86	.73	.63	.46

[a] The levels for GNS and job scope would represent the 16⅔, 33⅓, 50, 66⅔, and 83⅓ percentiles of these variables if they were normally distributed.

[b] $\text{Slope} = (.4025 + .0238\ \text{GNS} - .0146\ \text{Job Scope}) \times (4.0555/1.1210)$.

[c] $\text{Slope} = (.4543 + .0511\ \text{GNS} - .0214\ \text{Job Scope}) \times (4.0555/1.2257)$.

In both samples, the slopes decline in magnitude at each level of GNS as job scope increases. In the R&D sample, the declines in slopes are substantial for internal work motivation and somewhat smaller in magnitude for general and growth satisfaction. In this sample, internal work motivation revealed the major impact of the effect of curvilinearity.

In Federal Agency—B, substantial declines in slopes can be seen for general satisfaction and growth satisfaction. As noted earlier, no significant curvilinear effect was found for internal work motivation. The magnitude of the declines in slopes was approximately the same for the two affective response variables, although considerably greater than the declines for the same variables in the R&D sample.

Comparison of the slopes in Tables 4 and 5 for the curvilinear extension to those in Table 3 for the basic job characteristics model further emphasizes the effect of curvilinearity. The slopes for the curvilinear extensions for jobs average or better in scope are smaller than the slopes from the basic model. Slopes from the curvilinear extension for jobs well below average scope are larger than the slopes from the basic job characteristics model. In these two samples, above average increases in job scope are accompanied by diminishing returns in affective responses. (The magnitude of the change in slopes declined from low GNS to high GNS suggesting that the second extension may be operating in the data. Although no statistically significant improvement in the R^2 occurred after the introduction of the Job $\text{Scope}^2 \times$ GNS term in any of the regressions, the consistency of the pattern of change in the slopes at the various levels of GNS suggests this extension to the theory is perhaps worthy of further study.)

DISCUSSION

The job scope-growth need strength interactions predicted by the basic job characteristics model were found in two of the three samples. More positive responses to jobs broad in scope were found for people with strong growth needs than people with weak growth needs.

The sample from Federal Agency—A, however, showed a sharply opposite result, thus weakening the general support for the basic job characteristics model provided by the data. The declining slopes with increasing growth needs is directly opposite to what the model predicts. Furthermore, the small slope coefficient for individuals in this sample with strong growth needs indicates little relationship between affective response and jobs of broad scope, but for those with weak growth needs a strong positive relationship was found. Unfortunately, this result is not amenable to ready explanation.

The increments in R^2 shown in Table 2 after the introduction of the interaction and curvilinear terms to the simple additive model are not impressive. One would be tempted to conclude that the more complex curvilinear model may have theoretical significance but is of little practical importance. Such a conclusion has been relatively common among users of hierarchical multiple regression in the job design literature (e.g., Kidron, 1977; Stone, 1976; Stone, Mowday, & Porter, 1977). For reasons set out in some detail elsewhere (Champoux & Peters, in press), the present author fundamentally disagrees with solely using the magnitude of the increment in R^2 to assess the practical significance of a set of results.

The reader may assess for himself whether the results reported here have practical as well as theoretical importance. In making this assessment, it seems appropriate to consider the following evidence:

1. The magnitude of the differences in standardized slopes at high versus low job scope reported in Tables 4 and 5 with respect to the standard deviations of job scope (R&D sample, $sd = 4.2$; Federal Agency—B, $sd = 4.1$).

2. The magnitude of the differences in slopes between the curvilinear extension and the basic job characteristics model for jobs average or better in scope (comparison of slopes in Tables 4 and 5 to those in Table 3) while also considering the standard deviations of job scope.
3. The number of people to whom the curvilinear extension applies in the present samples. Approximately 40 percent of the people in the samples within which a curvilinear relationship was found were in jobs above average in scope.

Because the curvilinear extension to the basic job characteristics model predicted a less positive response to jobs broad in scope than to jobs narrow in scope, the substantial decrease in the slopes for the curvilinear extension is of particular interest. The potential inverted U relationship that was predicted did not occur in these data because none of the slopes for jobs broad in scope turned negative. In the present case it is difficult to conclude whether a "ceiling effect" from the less-than-perfect measures produced the asymptote rather than an inverted U.

The present results, plus those of the earlier study (Champoux, 1978a), suggest that the curvilinear relationship between job scope and affective response should be made a fundamental part of the job characteristics model of work motivation. Consequently, data obtained in future research directed at job design and motivation should be examined for curvilinearity.

The curvilinear relationship between job scope and affective response has important implications for job redesign projects. If curvilinearity is found in data collected in such projects, then a diminishing return from increasing job scope could be expected. If future research continues to find a curvilinear relationship between job scope and affective response, perhaps there should be less optimism about potential payoffs from job redesign efforts directed at increasing the scope of jobs.

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Worker Alienation as a Moderator of the Job Quality-Job Satisfaction Relationship: The Case of Racial Differences[1]

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The study, a test of the individual differences moderator hypothesis, used data from six national samples and incorporated a full range of job quality and a heretofore unexplored index of "worker alientation from mainstream work norms" (i.e., employee race). Evidence was found that the moderator hypothesis is descriptively valid, but additional complexities must be considered before firm conclusions are drawn.

The question of whether individual differences variables moderate the relationships between job attributes (e.g., skill requirements, discretion) and employee attitudinal reactions has generated a substantial amount of empirical research. Drawing heavily on the results of a study by Turner and Lawrence (1965), Hulin and Blood (1968) argued that increasing job scope will only lead to improved attitudes and/or performance for workers who are integrated into mainstream culture. For "alienated" workers, the relationship of job quality indices with attitudes and performance will be less positive, zero, or negative. These three predicted magnitudes and directions of relationship (i.e., less positive, zero, or negative) represent three different degrees of strength of the moderator hypothesis.

The search for individual differences moderators of worker responses to differences in job level has been pursued from several perspectives. In an updating of Hulin and Blood's (1968) review of the area, White (1978a) examined the results of 29 empirical investigations of individual differences moderators of the relationship between job quality and job occupant response. After reviewing the related research, White concluded that the results were, at best, mixed and that the search for individual differences moderators should be abandoned. However, Pierce and Dunham (1976), after reviewing much of the same literature, argue that the individual differences moderators hypothesis is valid and worthy of further research. Apparently the interpretation of the results of individual differences research is as mixed as the results themselves.

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[1] The data utilized in this study were made available by an interuniversity research consortium. The data for the 1972-77 General Social Survey, National Data Program for the Social Sciences, were collected originally by James A. Davis of the National Opinion Research Center, University of Chicago, and were distributed by Roper Public Opinion Research Center, Williams College. Neither the original collector of the data nor the consortium bears any responsibility for the analyses or interpretations presented herein. The author expresses his appreciation to two anonymous reviewers for their helpful comments.

Two serious faults accompanying much of the published research are the nature of the moderator variables studied and the samples employed. For example, many of the studies have relied on personality indices as moderators. Typical personality measures that have been studied include authoritarianism (Aldag & Brief, 1975; Vroom, 1959), need for independence (Tosi, 1970; Vroom, 1959), Protestant work ethic (Stone, 1976; Wanous, 1974), higher order need strength (Brief & Aldag, 1975; Hackman & Lawler, 1971; Hackman & Oldham, 1976), and locus of control (Robey, 1974; Sims & Szilagyi, 1977). However, personality scales are widely regarded as notoriously poor predictors (Guion & Gottier, 1965). Another hypothesized moderator that has received a good deal of attention is employee urban/rural residence (Blood & Hulin, 1967; Castellano, 1976). The use of urban/rural residence as a moderator has not been without controversy in that what is meant by urban/rural residence is conceptually closer to the notion of "quality of life" than simple municipal population. For example, the cities of Cleveland and San Diego are roughly equivalent in terms of population, yet they are very different in terms of quality of life. Also, indexing quality of life from census data, using such characteristics as population density and extent of slums has proved problematic (Hulin, 1971; Schuler, 1972; Shepard, 1972; Hulin, 1972).

The samples used in most investigations have been "nested" within a few job levels (e.g., only machine operators or only managers are studied), and/or nested within a single company, and/or nested within a geographic region. Even a study that specifically investigated the generalizability of individual differences moderators across research sites (White, 1978b) and that sampled 2,431 employees from all hierarchical levels was still limited in that (1) all 14 plants (research sites) were located in the same general geographic region (a medium-sized city of 200,000 or its adjacent geographic area), (2) there were no noticeable differences in the general characteristics of the work forces (also, all employees at the various sites were drawn from the same labor market pool), and (3) all the companies studied (six in total) were family owned.

A correct test of the validity of the individual differences moderator hypothesis necessitates that the full range of job quality be sampled in conjunction with the assessment of a moderator variable whose construct validity is less questionable as an index of "alienation from mainstream work norms." The present investigation seeks to make such a test by analyzing job satisfaction for a national sample of employees representing the full range of job quality in association with an aggregate measure of cultural alienation (employee race). Although racial differences in job satisfaction have been reported (Bartol, Evans, & Smith, 1978; O'Toole, 1973; O'Reilly & Roberts, 1973; Slocum & Strawser, 1972), the present study is more concerned with differences in relationships as a function of race than main effect differences.

In short, the hypothesis under investigation is that employee race moderates the relationship between job quality and job satisfaction. More specifically, *it is anticipated that for workers who are members of the cultural mainstream (whites) the relationship between job satisfaction and job quality will be stronger than the same relationship for workers who are, in the aggregate, less accepted as members of the dominant culture by virtue of discrimination or personal choice (blacks).*

METHOD

A total of 2,569 full-time male workers (2,303 whites and 266 blacks) were surveyed by the National Opinion Research Center as part of the General Social Surveys conducted during 1972, 1973, 1974, 1975, 1976, and 1977 (Davis, 1977). Respondents were questioned in their homes by trained interviewers who were typically of the same race. The sampling scheme of the General Social Survey is multistage area probability sampling to the block level, with quota sampling at the block (or geographic tract) level based on 1970 census tract data for age, sex, and employment status.

In addition to providing demographic information (race, age, years of education), each respondent expressed his degree of global job satisfaction by answering the following question: "On the whole, how satisfied are you with the work you do—would you say you are very satisfied (coded 1), moderately satisfied (coded 2), a little dissatisfied (coded 3), or very dissatisfied (coded 4)." Since facet-free measures of job satisfaction commonly yield skewed distributions, the satisfaction data were put through a common logarithmic transformation in order to correct partially for skew.

Job quality was indexed by transforming each respondent's description of his work duties and title into an occupational prestige score. Prestige was measured on the Hodge-Siegel-Rossi Scale (Siegel, 1971). This scale yields a score, ranging from 12 to 82, for each of 986 census occupations.

RESULTS

The means, standard deviations, and intercorrelations for the variables of interest are presented in Table 1. Also noted in Table 1 are the results of *t*-tests for mean differences of blacks versus whites. These results suggest that black workers, relative to whites, are on the average less satisfied with their work, hold jobs of lower occupational prestige, and are less well educated.

A test for significant differences among the intercorrelations of the variables for the two groups of workers (employing Fisher's r-to-Z transformation) suggests that (1) the direction of the relationship between age and occupational prestige is positive for whites but inverse for blacks, (2) worker's age is more strongly (inversely) related to educational attainment for blacks relative to whites, (3) educational attainment is negatively related to job dissatisfaction for whites but positively related (although not significantly so) for blacks, and (4) prestige and dissatisfaction are more strongly related for whites relative to blacks.

TABLE 1
Means, Standard Deviations, and Intercorrelations for Whites and Blacks

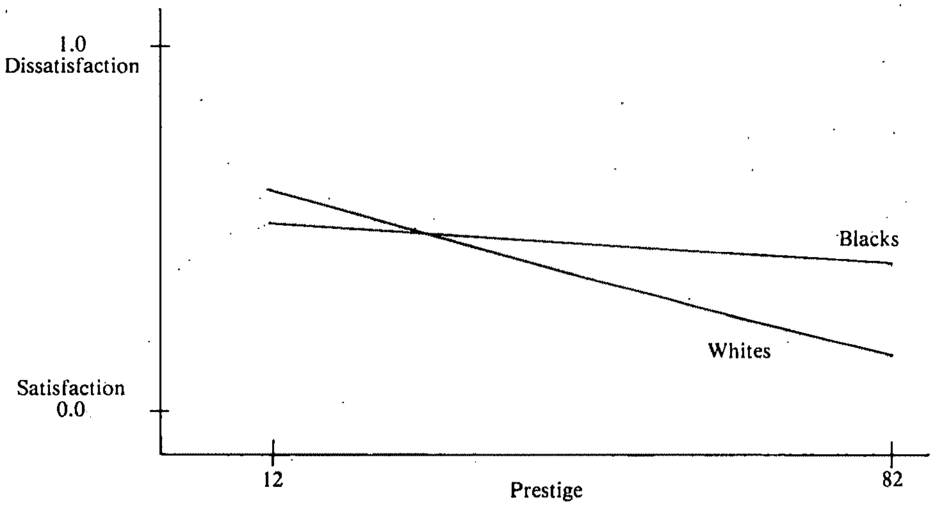
Variable	*Mean*	*S.D.*	*Range*	*1*	*2*	*3*
			Whites (N=2303)			
1. Prestige	42.23[a]	13.84	12-82	—		
2. Age	40.33	12.99	19-87	.09*[a]	—	
3. Education	12.69[a]	3.19	0-20	.56*	-.14*[a]	—
4. Dissatisfaction	.39[a]	.44	0-1.386	-.18*[a]	-.17*	-.09*[a]
			Blacks (N=266)			
1. Prestige	32.75[a]	12.83	12-78	—		
2. Age	40.25	13.02	18-76	-.17*[a]	—	
3. Education	10.79[a]	3.56	0-20	.46*	-.43*[a]	—
4. Dissatisfaction	.46[a]	.44	0-1.386	-.04[a]	-.19*	.08[a]

[a] Denotes significant differences ($p<.05$), whites versus blacks.
*$p<.01$

For a formal test of the individual differences moderator hypothesis, moderated regression analysis was performed for the dependent variable of job dissatisfaction (Kerlinger & Pedhazur, 1973). This procedure tests the significance of the increment in accountable criterion variance that results from comparing the R^2 derived from a regression model that includes two independent variables with the R^2 derived from a regression model that includes the two independent variables plus a multiplicative interaction term. The independent variables of the first regression model were respondent race (coded 0 for black and 1 for white) and occupational prestige. The second regression model was composed of the same two independent variables plus an interaction term (race × prestige). For the additive effects model, R^2 equalled .0312 ($F=41.32$, $df=2/2566$, $p<.01$). For the additive-plus-interactive effects model, R^2 equalled .0328 ($F=29.00$, $df=3/2565$, $p<.01$). The increment in R^2 resulting from a comparison of these models (.0016) also was statistically significant ($F=4.40$, $df=1/2565$, $p<.05$). This indicates that a significant interaction exists for the independent variables of race and prestige. (Blood and Mullet [1979] have demonstrated that the traditional approach to conducting moderated regression analysis is overly conservative in that moderated regression analysis gives strong preference to linear explanations. Their contention is that it is not possible to rule out a moderator as an underlying factor for a dependent variable by simply showing that linear effects alone can account for most of the variance in the dependent variable. They argue that the hierarchical procedures of moderated regression should not be permitted to "rob" the moderator term of significant covariance with the dependent variable without prior theoretical justification. Because the present study employed the traditional hierarchical procedure of moderated regression [i.e., entering the linear components before the interaction], the effect due to interaction must be judged as significant because of the conservative nature of the hierarchical procedure. For the sake of future researchers concerned with contrasting the traditional hierarchical procedures of moderated regression with more liberal procedures and in the interest of completeness, the correlations between dissatisfaction and race, dissatisfaction and the multiplicative interaction term, dissatisfaction and prestige, and race and prestige were -.05, -.16, -.18, and .21, respectively [$n = 2{,}569$].)

In order to determine the direction of the interaction and to determine whether the nature of the interaction is disordinal or ordinal (i.e., whether the regression lines cross-over), separate bivariate regressions were plotted (see Figure 1). From the plots of the regression lines it is evident that for jobs of lower occupational prestige, blacks express greater satisfaction relative to whites, and for jobs of higher occupational prestige, whites express greater satisfaction relative to blacks (i.e., the interaction is disordinal).

FIGURE 1
Plots of Bivariate Regressions



Group	Slope	Intercept
Blacks	-.0014	.503
Whites	-.0057	.628

The Johnson-Neyman (1936) technique was employed to estimate the ranges of the independent variable (prestige) along which the respondent groups differ significantly on the dependent variable of job dissatisfaction. The results of this technique (with α set at the .01 level) yielded prestige values of 37.00 and 29.06. This indicates that for jobs with prestige values greater than 37.00 (corresponding roughly to such jobs as auto mechanic and barber) whites are significantly more satisfied in the aggregate than blacks, for jobs with prestige values less than 29.06 (corresponding to such jobs as file clerk and sign painter) blacks are significantly more satisfied relative to whites, and for jobs between these two prestige values black and whites do not differ significantly in terms of job satisfaction.

On closer examination, however, it was determined that this significant interaction was partially a result of additional influences. Specifically, this point was uncovered by simultaneously partialling-out the influences of education and age from the correlations of satisfaction and prestige for each racial grouping. The resulting second-order partials were -.08 (n.s.) and -.13 ($p < .001$) for blacks and whites, respectively. These partialled correlations were not significantly different. Therefore, the obtained interaction of race and prestige, although it is a valid summary of extant aggregate differences in relationship, is more fully understood as being, in part, a by-product of further demographic differences between the two racial groupings.

DISCUSSION

In addition to reaffirming previously established significant main effect differences between blacks and whites on measures of job satisfaction, occupational attainment, and educational attainment, the present findings point to significant differences in the manner in which these variables are related for blacks relative to whites. Inverse directions of the relationships between age and job prestige and between education and job satisfaction are suggestive of the operation of different labor market processes for blacks and whites. Apparently younger blacks relative to older blacks are in positions of higher occupational prestige, whereas the relationship is reversed for whites. This may be reflective of differences in educational attainment, job opportunities, and career aspiration levels for younger versus older blacks. By comparison, the situation for younger versus older whites is not in flux. The relationships between education and satisfaction also are suggestive of differing labor market processes. Seemingly, the mainstream "promise" that greater educational attainment brings greater life (job) satisfaction (and prestige) is more true for whites than for blacks.

The results of the current test of the individual differences moderator hypothesis suggest two conclusions. First, advocates of the individual differences moderator hypothesis, for example, Pierce and Dunham (1976), are generally correct in the assertion that differences exist in the relationship of job quality and job satisfaction as a function of worker alienation.

However, the network of relationships is more complex than would be suspected from this conclusion. In fact, the differences in relationship, although valid in a purely aggregative-descriptive sense, are substantially reduced when other variables are controlled. The second conclusion is that the magnitude of these differences in relationship, as would be predicted from White (1978a), is not impressive. The extent of overlap of both groups of workers (mainstream and non-mainstream) is such that little predictive utility would be gained by considering individual worker alienation when making decisions in the areas of job selection or job assignment. However, the results of the present study perhaps should be viewed as providing a lower limit to the moderator relationship because the expediently brief measure of job satisfaction, which did not fully embody the current sophistication of psychometric technology, severely limited the amount of criterion variance that could be accounted for.

In summary, the present study upheld the descriptive validity of the intuitively appealing notion of the individual differences moderator hypothesis for a national sample of full-time workers. However, the demonstrated influence of additional variables argues against a simplistic interpretation of the moderator hypothesis. Also, it is becoming increasingly apparent from the cumulative findings of empirically-based research that the magnitudes of the observed moderator effects may not be sufficiently great (even with the aid of increased ranges on critical variables and closer approximation to operationally defining "worker alienation") to warrant adherence to moderator-derived recommendations for personnel decisions. Although the moderator hypothesis may prove to be of substantial predictive utility in a given company for given jobs, it would be difficult to justify, on an a priori basis, the devotion of time and effort to the search for such moderators. Moreover, currently there are strict legal guidelines that may circumscribe the use of identifiable individual differences moderators in personnel-related decision making.

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The Role of Managerial and Professional Motivation in the Career Success of Management Professors[1]

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Two limited domain theories of organizational motivation, the professional and the hierarchic, were tested in the professional context using professor members of the Academy of Management as subjects. As hypothesized, the results supported the professional theory, but not the hierarchic. Implications for professional practice and for professional organizations are considered.

The research reported here represents a test of one of four closely coordinated limited domain theories of organizational energy (Miner, 1976; 1978a; 1979). The first of these four, managerial role-motivation theory, is a theory of hierarchic inducement systems. It has been in existence for over 20 years and has generated a considerable body of research, most of which is supportive (Miner, 1965; 1977; 1978c). The second theory, which applies to the domain of professional inducement systems, is of recent origin, at least in its present form, and was tested for the first time in this study. The remaining two theories, dealing with group inducement systems and task inducement systems, have not been directly tested as yet, primarily because measures to operationalize the variables have not been created. However, research related to McClelland's (1961, 1962) theory of the achievement situation does provide indirect support for the task inducement theory.

The guiding hypothesis for the research reported here is that *the theory of professional inducement will more effectively predict professional career accomplishment than will the hierarchic inducement theory*. The research itself has been conducted among professors employed in colleges and universities who are members of the Academy of Management.

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[1] This paper is based on a presidential address given at the Academy of Management meetings in San Francisco, California, 1978.

The professional theory views work effort or energy as being induced as a result of the flow of role requirements from a profession and its norm transmitting association(s); thus, cosmopolitan rather than local methods of influence are emphasized (Gouldner, 1957). At least five types of role prescriptions are hypothesized to combine with appropriate motivational patterns within the individual to induce work energy of the kind that powers organizations. The five role prescriptions of the professional theory were developed from various definitions of professionals and professional organizations such as those of Etzioni (1964), Satow (1975), and Vollmer and Mills (1966), and from certain research on professionals (Hall, 1967; Harrison, 1974; Sorensen & Sorensen, 1974):

1. Acquiring knowledge. In a profession technical expertise and knowledge must be developed, transmitted, and used in the service of clients. Thus, a professional should desire to learn and acquire the knowledge that permits providing an expert service.
2. Independent action. In a profession the individual has a private and personally responsible relationship with clients of a kind that typically requires autonomous action based on individual professional judgment. Thus, a professional should be an independent person and desire to act independently of others.
3. Accepting status. In a profession the successful provision of services to clients is predicated on client recognition of the existence of expert status. Thus, a professional needs to desire status in the eyes of others and the symbols of status in order that the available services be utilized. Involved here is a particular kind of visibility that not only attracts attention but also yields recognition and respect of a kind that will attract and retain clients.
4. Providing help. In a profession the client-professional relationship is central, and within that relationship the client should be assisted in achieving desired goals, or on occasion that which is considered by the profession to be in the client's best interest, even if not actually desired by the client. Thus, a professional must possess a desire to help others to achieve their best interests. This type of motivation, although normally described as a desire to serve others, is conceived as being conceptually comparable to the "helping power" construct as elaborated by McClelland (1975).
5. Professional commitment. In a profession there needs to be a strong tie to the profession of a kind that keeps members responsive to ethical norms, and this tie typically is mediated through a sense of personal identification or commitment. Thus, a professional should possess a high level of value-based identification with the profession and commitment to it.

Among various hypotheses derivable from the professional theory (Miner, 1980a), the one of significance for the present research is that within the domain of the theory *the individual who possesses the indicated motivational patterns at a high level will achieve generally accepted criteria* *of professional success more frequently than will the individual who lacks these motives.* The domain involved is defined by the various criteria of professional practice, including the acquisition of a set of specialized techniques supported by a body of theory, the development of a career supported and influenced by an association of colleagues, the establishment of a consensus within society that recognizes professional status, and the existence of a specified set of professional norms or ethics (Miner, 1978a). Within this domain other types of motives having little or no conceptual relationship to specifically professional performance would not be expected to yield evidence of empirical relationships with success criteria.

Because of its parallel position to the theory of professional inducement systems, managerial role-motivation theory was selected to test the expectation of no relationship for theories dealing with domains others than the professional. This theory appears particularly germane because the sample studied consisted of professors of management who, however, were not actually managers of hierarchic systems. The sample falls within the professional domain, but within that space would appear to be conceptually closer to the hierarchic domain than would many other professions. Accordingly, a theoretical test against hierarchic predictors has something of the quality of a crucial experiment: if the differential prediction hypothesis is confirmed here at the boundary, it is very likely to be confirmed for more conceptually distant professions as well.

The hierarchic theory has been in the literature for many years, the first formal statement being in Miner (1965). It is a theory for managers of bureaucracies large enough to require formalized written communication. As originally conceived, it was an extrapolation from the observations and clinical insights of the author as they applied to the Atlantic Refining Company in the late 1950s. Later the theory's domain was expanded to include large bureaucracies more generally. Its six role prescriptions are:

1. Authority figures. In a hierarchic organization there must be communication and interaction upward with superiors, and favorable attitudes toward superiors facilitate this. Thus, a favorable attitude toward authority figures generally is necessary to make hierarchic communication function as it should.
2. Competitive activities. In a hierarchic organization rewards such as promotion to the highest levels and the largest salaries are differentially distributed and relatively scarce. Thus, it becomes necessary for managers to compete with peers to attain rewards, and a desire to compete in this manner is required.
3. Assertive role. In a hierarchic organization the managerial role typically is modeled on the traditional father role. Thus, a degree of assertiveness or "take charge" attitude congruent with the father role becomes necessary, and a desire to assert oneself in this sense is needed.
4. Imposing wishes. In a hierarchic organization manipulation of sanctions and downward supervision are essential consequences of the structure. To the extent that such activities yield satisfactions, they

are more likely to be performed. Thus, a desire to impose wishes and exercise power becomes a characteristic a manager should possess.

5. Standing out from group. In a hierarchic organization managers must assume a highly visible position clearly differentiated from the relative homogeneity of their subordinates. Thus, they must want to assume a distinctive position where they stand out from the group, if they are to meet role requirements. Managers, in contrast to professionals, have a subordinate group to deal with, and their role requires them to act differently than the members of that group, thus giving them considerable visibility, if not necessarily status.
6. Routine administrative functions. In a hierarchic organization various routine decision making and communication tasks must be carried out if the organization is to function. Thus, a manager should desire to perform routine administrative duties in a responsible manner.

METHOD

Sample

The subjects were 112 professors employed by colleges and universities in the United States. These individuals were the ones from an original randomly selected 10 percent sample of the Academy of Management's U.S. faculty membership who responded to a single mailing. The original sample contained 348 names; thus a response rate of 32 percent was achieved. The data were collected in early 1978. The Academy of Management's membership is predominantly made up of regular faculty members, most of them teaching one or more aspects of the management discipline in schools of business administration. Student members and members employed outside the academic setting were not included in the study. The mean age of the professor respondents was 43.5 years, with a standard deviation of 11.9.

It was possible to check on the representativeness of the respondent sample by comparing respondents and nonrespondents from the original 10 percent sample on several variables regularly entered into the professional organization's computer files. These included membership in the various professional divisions of the Academy, which numbered 14 at the time of the study, area of the country broken down into 8 regions, and whether membership dues were paid up or not. Of the 23 comparisons, only one yielded a significant difference—a disproportionately high number of members of the Social Issues Division in the respondent sample ($\chi^2 = 4.35$, $p < .05$). This one finding could well have occurred by chance. Thus the data do not provide evidence that would refute a claim of representativeness for the sample of 112. Comparisons with data from other, much larger samples (numbering over 1,000) of the Academy's membership also appear to indicate that representativeness was attained (Forsgren, 1978; Wren, Atherton, & Michaelsen, 1978). On the other hand, a number of management professors are not members of the Academy of Management, and those who are can be assumed to be among the professionally more active. Furthermore, it is entirely possible that the respondents are more active than the nonrespondents.

In general the nature, and limitations, of the sample would be expected to introduce a conservative bias in the results. Heterogeneity of organizations characteristically increases error variance over what would be anticipated from most single organization studies because the criteria are based on a more diverse set of considerations. Because the sample is probably more professionally active than the population it is intended to represent, some restriction of range and thus lower correlation values may result.

Predictor Measures

Miner Sentence Completion Scale (MSCS)—Form P—This instrument was devised specifically for this study. It is intended as a measure of the five motivational patterns specified by the professional theory. It contains 40 sentence completion items, each of which is scored + 1, 0, or − 1 depending on whether the response indicates approach, unknown, or avoidance motivation. The total item score accordingly may vary from a possible high of +40 to a low of −40. In addition, subscale scores based on randomly distributed sets of eight items may be obtained. These subscales are intended to correspond to the five variables of the professional theory, and scores on each may range from + 8 to − 8; there are no filler items. As indicated in Table 1, all subscales correlate with the total item score in the range .48 to .69 in the study sample; the median correlation between the subscales of Form P is .16. Examples of the kinds of items utilized in this instrument are given in Table 2.

The specific items included in the final version of Form P were selected from a much larger item pool that had been pretested on an entirely independent sample from the one utilized in this study. This was the same approach utilized in developing Form H some 20 years ago. Within the subset of items established for each subscale those ultimately selected exhibited the closest relationship with a global rating of the relative professional accomplishments of the pretest subjects. In addition, to be used, items had to yield sufficiently high frequencies in both the approach and avoidance motivation categories so that they could in fact discriminate, rather than merely load a constant value into the scores. The specific scoring procedures or rules used to categorize completions also were established in advance from the pretest sample.

Although extensive analyses of the psychometric properties of Form P itself have not been carried out as yet, such analyses have been made using the original Miner Sentence Completion Scale (Form H), and various derivatives of it (Miner, 1978b). In view of the virtually identical formats and scoring procedures used with the two instruments, there is reason to anticipate comparable psychometric results. However, in view of the greater

TABLE 1
Intercorrelations Among MSCS-Hierarchic (Form H) and MSCS-Professional (Form P) Measures
($N = 112$)

Within instrument correlations—MSCS—professional

	Acquiring Knowledge	*Independent Action*	*Accepting Status*	*Providing Help*	*Professional Commitment*
Total item score	.58**	.48**	.69**	.57**	.60**
Acquiring knowledge		.09	.33**	.19*	.08
Independent action			.17	.13	.04
Accepting status				.14	.29**
Providing help					.32**

Within instrument correlations—MSCS—hierarchic

	Authority Figures	*Competitive Games*	*Competitive Situations*	*Assertive Role*	*Imposing Wishes*	*Standing out from Group*	*Routine Administrative Functions*
Total item score	.29**	.54**	.46**	.55**	.58**	.63**	.57**
Authority figures		-.10	-.11	.07	.09	.04	.21*
Competitive games			.30**	.19*	.11	.13	.17
Competitive situations				.05	.20*	.27**	-.03
Assertive role					.22*	.24*	.20*
Imposing wishes						.30**	.18
Standing out from group							.29**

TABLE 1 (cont.)
Intercorrelations Among MSCS-Hierarchic (Form H) and MSCS-Professional (Form P) Measures
($N = 112$)

Between instrument correlations

	MSCS—Professional					
	Total Score	*Acquiring Knowledge*	*Independent Action*	*Accepting Status*	*Providing Help*	*Professional Commitment*
MSCS—Hierarchic						
Total item score	.33**	.09	.15	.25**	.30**	.18
Authority figures	.03	.04	−.02	−.05	.04	.07
Competitive games	.21*	.10	.22*	.10	.15	.07
Competitive situations	.05	.02	.14	.05	.00	−.05
Assertive role	.25**	.06	.04	.27**	.20*	.15
Imposing wishes	.20*	.05	.03	.14	.22*	.15
Standing out from group	.21*	.00	.09	.19*	.21*	.14
Routine administrative functions	.20*	.05	.01	.20*	.23*	.10

*$p < .05$
**$p < .01$

TABLE 2
Examples of the Types of Items Used to Measure Theoretical Variables

Hierarchic Motivation	*Professional Motivation*
Authority figures	Acquiring knowledge
The president...	Foreign intelligence work...
County sheriffs...	Taking special courses...
Competitive games	Independent action
Wrestling matches...	Making my own career decisions...
Playing tennis...	Management consultants...
Competitive situations	Accepting status
Working to get good grades...	Holding community office...
Employment tests...	Prestige...
Assertive role	Providing help
Fly fishing...	Social service work...
Owning a sports car...	When someone is hurt...
Imposing wishes	Professional commitment
Enforcing regulations...	Working long hours...
Making children mind...	Codes of ethics...
Standing out from group	
Being a cheerleader...	
Testifying in court...	
Routine administrative functions	
When there are many details to handle, I...	
Catching up on correspondence...	

number of items (eight rather than five) used in each subscale, Form P might yield somewhat higher subscale reliabilities. Such a result could introduce a differential advantage in favor of the Form P measures over Form H in predicting criteria.

In an effort to check on this possibility, the internal consistency (corrected odd-even) reliability of Form P was determined for the total sample of 112 professors. The total score value was .59, and the subscale coefficients ranged from .02 to .43 with a median of .31. These figures are substantially *below* the repeat administration reliability of Form H. They also are so low as to bring the use of Form P into serious question, based on traditional psychometric assumptions. However, Atkinson (1977) reports several studies that lead him to conclude that when projective measures are used, substantial construct validity can be obtained even where there is no internal consistency reliability. Given these findings, and in the absence of the more appropriate repeat administration reliability measures, it seemed justified to proceed with the analysis of the Form P data.

Miner Sentence Completion Scale—Form H—This instrument is of the same type as Form P. However, it measures the six variables of the hierarchic theory with seven 5-item subscales—there are two subscales for competitive activities, dealing with games and other situations, respectively. Each subscale score may vary from +5 to −5 and the total item score from +35 to −35. Five filler items bring the total in the instrument to 40. The best estimate of the total item score reliability is .83, based on repeat administrations over a 10-week interval. The comparable subscale reliabilities are in the range .44 to .63.

In the management professor sample the seven subscales correlate with the total item score in the range .29 to .63, and the median correlation between subscales is .18 (see Table 1). In contrast, the median of the correlations between the subscales of Form P and Form H is .09, roughly half the within instrument values. To the extent the two comprehensive measures are significantly intercorrelated, this appears to be a function of low positive coefficients involving the accepting status and providing help subscales of the professional scale and the assertive role, imposing wishes, standing out from group, and routine administrative functions subscales of the hierarchic scale. The focused nature of these relationships argues against the existence of a pervasive response bias operating across both instruments; the correlation of .33 between the total item scores appears to be attributable to only 6 of the 12 subscales.

Criterion Measures

Compensation—As with all of the criterion measures, compensation was self-reported by the respondents. Nine different compensation measures were utilized.

1. University total. The regular yearly compensation from the employing organization reported, whether the typical mode of compensation was on an academic year or 12-month basis. A figure below $10,000 was given a score of 1 and each successive $5,000 interval added an additional point.
2. University 9-month. For those who reported an academic year compensation figure, the value used was the same as for university total compensation. For those who reported a 12-month figure this value was adjusted downward to 75 percent of the original and then the appropriate score was assigned based on the particular $5,000 range entered.
3. Management development. Additional income earned in the average year from the conduct of management development and other seminars. A score of 0 was assigned for values below $1,000, 1 for values in the $1,000 to $4,900 range, and each successive $5,000 interval added an additional point.
4. Consulting activities. Additional income earned in the average year from consulting activities. The scale was the same as for management development income.
5. Speaking engagements. Additional income earned in the average year from speaking engagements. Although the scale used for management development income was utilized initially, the values thus obtained were dichotomized as close to the median as possible and predictor-criterion relationships determined with biserial correlation due to the limited range.
6. Publishing royalties. Additional income earned in the average year from writing, including royalties and other earnings. Here, too,

limitations in range required dichotomization of the scale and the use of biserial correlations.

7. Other nonuniversity. Additional income earned in the average year from sources other than management development, consulting activities, speaking engagements, and publishing royalties. Specifically noted were teaching at other educational institutions and operating a business, but other earned income sources were included as well, such as serving on boards of directors and doing labor arbitration. The scale was the same as for management development income.
8. Total nonuniversity. The sum of the scale values for 3 through 7 above.
9. Total professional. The sum of 1 and 8 above.

Academic Rank—Academic rank was recorded in terms of the following scale: Instructor—1, Assistant Professor—2, Associate Professor—3, Professor—4, Professor with endowed chair or similar appointment—5.

Publications—Three different measures of publication effectiveness were used.

1. Books. The number of books actually published, with subsequent editions after the first counted .5. No correction for multiple authorship was used. Due to the large number of individuals who had not published any books, this measure was dichotomized and biserial correlations computed.
2. Journal articles. The total number of professional journal articles authored or coauthored.
3. Prestige articles. Articles authored or coauthored in the following publications: *Academy of Management Journal*, *Academy of Management Review*, *Administrative Science Quarterly*, *American Sociological Review*, *California Management Review*, *Harvard Business Review*, *Industrial Relations*, *Journal of Applied Psychology*, *Journal of Business* (Chicago), *Management Science*, *Organizational Behavior and Human Performance*, and *Personnel Psychology*.

The selection of these particular publications, although somewhat arbitrary, was influenced strongly by the results of a journal rating procedure developed by the management faculty at the University of Maryland. The journals included coincide closely with a listing of quality publications in the management field presented by Miller (1978), based on a survey of 208 management faculty members nationwide.

Professional Organizations—Measures in this area focused predominantly but not exclusively on the Academy of Management simply because it was known that all subjects belong to this organization:

1. Number of memberships. The reported number of *national* professional organizations in which the individual had achieved membership.
2. Attendance at meetings. The number of *national* Academy of Management meetings attended over the preceding 10 years.

3. Participation in meetings. The number of *national* Academy of Management meetings in which the individual was a program participant over the preceding 10 years.

Position Type—This measure was concerned with whether the individual had achieved an administrative or research appointment:

1. Administrative position. Of the 28 individuals with administrative appointments, 19 were department heads or in comparable positions, 3 were program chairpersons, 4 were associate deans, and 2 were deans. Analyses were carried out using an administrative-nonadministrative dichotomy and point biserial correlation.
2. Research position. Of the 24 individuals with research appointments, 8 were on funded research grants, 3 were on institute research staffs, and 13 had some release time from teaching, presumably primarily at institutional expense. Again predictor-criterion relationships were computed using the point biserial coefficient.

Doctoral Education—These indexes were included predicated on the assumption that greater professional prestige attaches to those most closely related to doctoral education and thus the perpetuation of the profession.

1. Department offers doctorate. Whether or not the department in which the professor worked had a doctoral program. This dichotomy was then used to calculate point biserial coefficients.
2. Supervises dissertations. Whether or not the individual supervises doctoral dissertations. These were primarily dissertations within the same department. However, in a few cases an individual in a department without a doctoral program nevertheless supervised dissertations in departments that did. Here, too, the point biserial correlation was used.

The 20 criteria tend to be quite closely related, as indicated in Table 3. Half of the variables are significantly related to 75 percent or more of the others. In order of number of significant relationships, these are: total professional compensation, total nonuniversity compensation, journal articles, books, prestige articles, publishing royalties compensation, academic rank, university 9-month compensation, management development compensation, and supervises dissertations.

The pervasive role that publishing plays in the profession is clearly evident in these results. None of the publications measures appear in the following ranking of the more peripheral criteria: speaking engagements compensation, university total compensation, attendance at meetings, number of memberships, participation in meetings, consulting activities compensation, department offers doctorate, other nonuniversity compensation, administrative position, and research position.

Of the 20 criteria, only one—research position—is significantly related to less than 40 percent of the other measures. Research appointments appear to be associated only with being in a doctoral department and supervising dissertations. The implication is that there is a type of individual who, although research oriented, does not necessarily publish more, do more in professional organizations, or get paid more.

TABLE 3
Relationships Among Criteria of Professional Success
($N = 112$)

	Correlations														
	Compensation									Publications			Professional Organizations		
	University														
	Total	9-month	Management Development	Consulting Activities	Speaking Engagements	Publishing Royalties	Other Non-university	Total Non-university	Academic Rank	Books	Journal Articles	Prestige Articles	Number of Memberships	Attendance at Meetings	Participation in Meetings
Compensation															
Total professional	.72**	.69**	.71**	.58**	.43**	.73**	.34**	.92**	.64**	.70**	.61**	.49**	.33**	.34**	.29**
University—total		.81**	.37**	.14	.18	.64**	.13	.40**	.78**	.61**	.38**	.35**	.23*	.37**	.16
University 9-month			.32**	.14	.37**	.69**	.20*	.47**	.77**	.61**	.50**	.43**	.23*	.42**	.23*
Management development				.45**	.64**	.61**	-.06	.74**	.25**	.47**	.34**	.25**	.18	.25**	.36**
Consulting activities					.57**	.33**	.10	.70**	.21*	.31**	.22*	.28**	.15	-.01	.07
Speaking engagements						.22*	.32**	.51**	.28**	.38**	.82**	.68**	.30**	.37**	.50**
Publishing royalties							.30**	.74**	.61**	.87**	.79**	.54**	.46**	.61**	.57**
Other nonuniversity								.38**	.25**	.08	.41**	.05	.24*	-.08	-.05
Total nonuniversity									.41**	.59**	.60**	.46**	.31**	.25**	.29**
Academic rank										.56**	.41**	.30**	.21*	.30**	.10
Publications															
Books											.47**	.38**	.36**	.41**	.41**
Journal articles												.57**	.48**	.21*	.31**
Prestige articles													.19*	.30**	.40**
Professional organizations															
Number of memberships														.05	.09
Attendance at meetings															.68**
Participation in meetings															

*$p < .05$
**$p < .01$

TABLE 3 (cont.)
Relationships Among Criteria of Professional Success
($N = 112$)

	t-Tests Between Means											
	Administrative Position			*Research Appointment*			*Department Offers Doctorate*			*Supervises Dissertations*		
	Administration (N=28)	*Not Administration (N=84)*	*t*	*Research (N=24)*	*Not Research (N=88)*	*t*	*Doctorate (N=43)*	*No Doctorate (N=69)*	*t*	*Dissertations (N=31)*	*No Dissertations (N=81)*	*t*
Compensation												
Total professional	8.3	5.7	4.18**	6.2	6.4	.76	7.3	5.8	2.36*	8.5	5.6	4.07**
University—total	5.7	4.1	6.52**	4.7	4.5	.56	4.8	4.4	1.66	5.5	4.2	5.14**
University—9 month	4.6	3.7	4.27**	3.9	3.9	.16	4.1	3.8	1.48	4.6	3.6	4.06**
Management development	1.0	.4	3.11**	.5	.6	.33	.7	.5	1.66	.8	.5	2.10*
Consulting activities	.8	.7	.71	.6	.7	.68	.8	.6	1.03	1.1	.5	3.05**
Speaking engagements	.1	0	.83	0	.1	.65	.1	0	1.36	.2	0	1.54
Publishing royalties	.6	.3	1.31	.3	.3	.02	.6	.2	2.06*	.6	.2	1.58
Other nonuniversity	.1	.2	.77	.1	.2	1.54	.3	.1	1.00	.3	.2	1.00
Total nonuniversity	2.6	1.6	2.08*	1.5	1.9	.87	2.5	1.4	2.28*	3.0	1.4	2.75**
Academic rank	3.6	3.0	4.79**	3.0	3.2	.61	3.2	3.1	.58	3.7	2.9	4.12**
Publications												
Books	1.6	.9	1.20	1.3	1.0	.60	2.1	.5	2.85**	2.7	.5	3.07**
Journal articles	14.7	8.4	1.10	9.1	10.2	.32	17.0	5.6	2.41*	21.4	5.6	2.53*
Prestige articles	1.3	1.2	.23	1.8	1.0	1.29	2.1	.6	2.76**	2.8	.6	3.26**
Professional organizations												
Number of memberships	3.4	3.0	1.11	3.3	3.1	.58	3.6	2.8	2.05*	3.9	2.8	2.24*
Attendance at meetings	3.4	2.1	2.62**	2.3	2.4	.18	2.5	2.3	.36	2.7	2.3	.74
Participation in meetings	1.3	.8	1.44	1.3	.9	1.35	1.4	.7	2.25*	1.5	.8	2.09*

	Chi Squares for Frequencies					
	Percent Research	χ^2	*Percent Doctorate*	χ^2	*Percent Dissertations*	χ^2
Administrative position						
Administration	18	.30	39	.07	43	4.40*
Not administration	23		38		23	
Research appointment						
Research			63	7.53**	54	10.89**
Not research			32		20	
Department offers doctorate						
Doctorate					65	48.87**
No doctorate					4	

*$p < .05$
**$p < .01$

The criteria utilized certainly do not exhaust the possibilities available, and questions can be raised regarding the appropriateness of some of the measures. Yet the high degree of intercorrelation does suggest a common bond, and the measures do tap a wide range of professional activities. In deference to the fact that certain of the criteria may be viewed by some as irrelevant to professional success, only individual criterion relationships were calculated; thus no overall, composite criterion measure was utilized.

Because all measures (predictor and criterion) were collected at the same time from the same individuals, there is some possibility that method specificity might influence the results. Several considerations argue against this. The predictors are projective in nature, the criteria self-report. The projective approach used has proved relatively immune to falsification, and subjects typically have no knowledge of what they are revealing about themselves. There appears to be a consensus among those knowledgeable on the subject that the sentence completion method is the most valid of the projective techniques (Shouval, Duek, & Ginton, 1975). The approach used to collect criterion data has been used widely in research for some time. See Porter (1964), for example. Although information of this kind often is distorted in the employment situation by applicants for lower level positions (Goldstein, 1971), this seems much less likely to occur under the present circumstances, in which the benefits from portraying oneself

TABLE 4
Age Correlations for MSCS and Criterion Variables
($N = 112$)

MSCS	*r*	*Criteria*	*r*
Hierarchic		Compensation	
Total item score	.00	Total professional	.48**
Authority figures	.14	University—total	.62**
Competitive games	−.02	University—9-month	.67**
Competitive situations	−.30**	Management development	.06
Assertive role	.20*	Consulting activities	.09
Imposing wishes	.00	Speaking engagements	.24*
Standing out from group	−.06	Publishing royalties	.43**
Routine administrative functions	.05	Other nonuniversity	.28**
Professional		Total nonuniversity	.30**
Total item score	.38**	Academic rank	.76**
Acquiring knowledge	.07	Publications	
Independent action	.09	Books	.34**
Accepting status	.24*	Journal articles	.34**
Providing help	.27**	Prestige articles	.17
Professional commitment	.45**	Professional organizations	
		Number of memberships	.14
		Attendance at meetings	.20*
		Participation in meetings	−.08
		Position type	
		Administrative position	.14
		Research appointment	−.21*
		Doctoral education	
		Department offers doctorate	−.13
		Supervises dissertations	.09

*$p < .05$
**$p < .01$

favorably would be expected to be much less pronounced. The MSCS Form P, MSCS Form H, and the biographical questionnaire containing the criterion items were each presented separately and completed in whatever order the subject chose, presumably varying from subject to subject.

RESULTS

As indicated in Table 4, a number of the professional career success criteria are related to age. In general, these relationships are positive, and in the case of academic rank and several of the compensation variables they are quite strong. The only significant negative relationship is for holding a research position—another indicator of the tangential nature of this variable.

On the other hand, the hierarchic MSCS yields no consistent pattern of relationship with age, a result consistent with that obtained in many other research studies. The professional MSCS differs in that some evidence of a positive relationship to age does appear for several subscales and, as a result, in the total score coefficient. The major source of this age relationship is the degree of professional commitment.

In view of these results it seemed important to determine whether significant predictor-criterion relationships would retain their significance with age effects removed. Accordingly, in Tables 5 and 6 the correlations obtained when age is partialed out are given in parentheses for all zero order correlations that reach significance.

Table 5 contains the findings bearing on the role of professional motivation in professional success. The median correlation of the total score measure with the 20 criteria is .35. All of the subscales appear to contribute to this result to a significant degree. The highest coefficient is .66 (for publishing royalties) and only seven negative values appear in the table—none even approaching significance. In all, 63 percent of the correlations are significant at the .05 level or better, and 80 percent of these (61 of 76) remain significant when age is partialed out.

Furthermore, the significant correlations tend to be concentrated among the more central criteria, as gauged by the high frequency of correlation of these criteria with other criteria. Among the 10 criteria with 75 percent or more significant correlations of this type, 82 percent of the predictor-criterion relationships are significant at $p<.05$. Among the other, more peripheral criteria, this percentage is only 45. Three of the four most tangential criteria—research position, other nonuniversity compensation, and a department offering the doctorate—yield no significant correlations at all. Interestingly the fourth such criterion, holding an administrative position, is strongly and consistently related to professional motivation.

The data on hierarchic motivation given in Table 6 differ sharply from those of Table 5. The median total score predictor-criterion correlation is .02. None of the subscales show a consistent criterion relationship,

TABLE 5
Correlations Between MSCS-Professional (Form P) and Criterion Measures[a]
($N = 112$)

	MSCS Measures					
Criterion Measures	*Total Score*	*Acquiring Knowledge*	*Independent Action*	*Accepting Status*	*Providing Help*	*Professional Commitment*
Compensation						
Total professional	.55** (.46**)	.28** (.28**)	.37** (.38**)	.30** (.22*)	.35** (.26**)	.31** (.13)
University—total	.57** (.47**)	.35** (.39**)	.21* (.19*)	.39** (.32**)	.36** (.25**)	.36** (.11)
University—9 months	.48** (.33**)	.19* (.19*)	.23* (.23*)	.32** (.22*)	.27** (.13)	.41** (.17)
Management development	.30** (.30**)	.13	.29** (.28**)	.23* (.23*)	.23* (.22*)	.00
Consulting activities	.23* (.22*)	.17	.27** (.26**)	.03	.20* (.19*)	.03
Speaking engagements	.28** (.21*)	−.01	.16	−.08	.29** (.25**)	.50** (.45**)
Publishing royalties	.66** (.60**)	.30** (.30**)	.53** (.54**)	.37** (.31**)	.28** (.19*)	.44** (.31**)
Other nonuniversity	.12	.05	.06	−.02	.12	.16
Total nonuniversity	.41** (.34**)	.18	.37** (.36**)	.18	.26** (.20*)	.21* (.09)
Academic rank	.51** (.37**)	.17	.27** (.31**)	.30** (.19*)	.31** (.18)	.44** (.17)
Publications						
Books	.53** (.46**)	.17	.45** (.45**)	.30** (.24*)	.28** (.21*)	.34** (.23*)
Journal articles	.42** (.33**)	.27** (.27**)	.27** (.26**)	.24* (.18)	.23* (.16)	.22* (.08)
Prestige articles	.30** (.26**)	.18	.27** (.25**)	.19* (.16)	.11	.15
Professional organizations						
Number of memberships	.30** (.27**)	.18	.19* (.18)	.19* (.17)	.16	.17
Attendance at meetings	.35** (.30**)	.07	.29** (.28**)	.25** (.21*)	.07	.32** (.26**)
Participation in meetings	.23* (.28**)	.03	.29** (.30**)	.16	.02	.16
Position type						
Administrative position	.43** (.41**)	.26** (.25**)	.22* (.21*)	.37** (.35**)	.21* (.18)	.19* (.15)
Research appointment	.02	−.02	.18	.02	.00	−.10
Doctoral education						
Department offers doctorate	.08	.17	.11	.05	−.08	−.04
Supervises dissertations	.35** (.35**)	.24* (.23*)	.33** (.32**)	.16	.24* (.23*)	.08
Median r	.35	.18	.27	.24	.23	.20

[a] Figures in parentheses are partial correlations with age partialed out.

*$p < .05$

**$p < .01$

TABLE 6
Correlations Between MSCS-Hierarchic (Form H) and Criterion Measures[a]
($N = 112$)

Criterion Measures	MSCS Measures							
	Total Score	Authority Figures	Competitive Games	Competitive Situations	Assertive Role	Imposing Wishes	Standing Out from Group	Routine Administrative Functions
Compensation								
Total professional	.08	−.01	.00	−.08	.06	−.01	.13	.19* (.19*)
University—total	−.09	−.02	−.05	−.21* (−.03)	.10	−.10	−.05	.00
University—9 months	−.10	−.05	−.02	−.21* (−.01)	.06	−.10	−.07	.00
Management development	.07	−.05	.01	.04	−.04	.01	.07	.22* (.22*)
Consulting activities	.20* (.20*)	.07	.04	.09	.06	.07	.20* (.21*)	.20* (.20*)
Speaking engagements	.15	.03	−.15	.03	.03	.10	.41** (.43**)	.11
Publishing royalties	.09	.02	.14	−.21* (−.08)	−.01	−.06	.14	.24* (.24*)
Other nonuniversity	.11	−.06	.04	.02	.08	.14	.13	.03
Total nonuniversity	.16	.00	.03	.01	.03	.05	.19* (.22*)	.25** (.24*)
Academic rank	.02	.03	.06	−.18	.15	−.05	−.05	.08
Publications								
Books	.09	.04	.25** (.28**)	−.08	−.02	−.17	.07	.17
Journal articles	.01	−.18	.04	−.05	.03	.00	.10	.07
Prestige articles	−.07	−.09	−.06	−.17	−.03	−.02	.07	.01
Professional organizations								
Number of memberships	.17	−.07	.02	.03	.11	.13	.16	.24* (.23*)
Attendance at meetings	.00	−.03	.05	−.10	.05	−.11	.08	.04
Participation in meetings	.00	−.13	.07	.04	−.07	−.02	.07	−.01
Position type								
Administrative position	−.04	−.05	−.08	.02	.02	−.02	.04	−.08
Research appointment	−.23* (−.23*)	−.11	−.13	−.05	−.10	−.15	−.14	−.15
Doctoral education								
Department offers doctorate	−.05	−.01	−.04	.09	−.13	−.05	.01	−.05
Supervises dissertations	−.02	.07	−.02	.04	−.06	−.02	.01	−.07
Median r	.02	−.02	.02	−.02	.03	−.02	.07	.06

[a] Figures in parentheses are partial correlations with age partialed out.

* $p < .05$

** $p < .01$

although standing out from group does appear to be related to compensation from speaking engagements, as might be expected, and to a lesser degree to consulting income, and routine administrative functions is minimally related to several sources of nonuniversity income. The largest positive correlation is .41 and the largest negative –.23. In total, there are 15 significant correlations (9 percent), 11 of which are positive and 4 negative. As in the case of professional motivation, 80 percent of these remain significant when age is partialed out.

When the findings are broken down in terms of criterion centrality, the greater efficiency in predicting central criteria noted for the professional measure is not repeated. With the 10 central criteria, 10 percent of the correlations are significant and with the remaining more peripheral criteria, 9 percent are. A large number of criteria, including appointment to an administrative position within a professional structure, do not yield any significant correlations at all, and several others produce only negative relationships.

DISCUSSION

The results obtained provide strong support for the hypotheses of this study and for the limited domain theory of professional inducement systems: managerial role motivation theory does not work outside its own domain, in the professional arena, but the more appropriate professional theory does. There is little basis for attributing these differential results to differences in reliabilities or to other such design deficiencies. In fact, the subscale findings tend to support Atkinson's (1977) contention that internal consistency reliability is not a necessary condition for construct validity. Although partialling out the effects of age serves to reduce the number of significant correlations somewhat, it does so equally for both theories. There is no reason to believe that the professional theory results are either particularly or uniquely age dependent. The failure to find evidence of a relationship between MSCS (Form H) variables and success indexes such as academic rank and administrative position is consistent with the results of an earlier, less well-controlled study of business school professors in various disciplines (Miner, 1977).

Another type of finding appears to give further support to the theoretical expectations. Inspection of the data of Table 7 suggests that management professors are consistently higher on professional than on managerial motivation—at least they are higher in this sample. The mean total scores for the sample as a whole are 5.57 and -2.31, respectively. Unfortunately, this comparison could be spurious, because it is not possible to adjust the Form P scores for "difficulty level," given its newness and the lack of normative data. There is no particular reason to believe that the item selection process for the two instruments differed with the consistency required to produce the kind of result obtained, but there is as yet no way to be sure that this is not the case.

On the other hand, the extremely low nature of the Form H scores can be documented. The mean total score of −2.31 contrasts sharply with the figure of roughly +5.00 which is typical for managerial samples (Miner, 1977). The assertive role and competitive games scores are particularly low. Standing out from group, which tends to be relatively high in teaching groups generally, is not depressed to any meaningful extent and the reduction in competitive situations is not pronounced. Overall, the scores on the hierarchic measure are at a level that would be anticipated when the instrument is applied to a mature sample falling outside the appropriate theoretical domain. Although the findings as a whole do not necessarily support the construct validity of the separate subscale measures, they do yield credence to the view that Form P as a whole taps something closely akin to professional motivation and that this motivation is in turn a factor in professional success.

TABLE 7
Mean Scores for Miner Sentence Completion Scale—Forms P and H in Total Sample and in Administrative and Nonadministrative Samples

MSCS—	*Total Sample (N=112)*	*Administration (N=28)*	*Nonadministration (N=84)*	*t*
Professional				
Total item score	5.57	11.11	3.73	5.02**
Acquiring knowledge	.41	1.57	.02	2.85**
Independent action	2.01	2.96	1.69	2.40*
Accepting status	1.29	3.04	.72	4.73**
Providing help	1.69	2.50	1.42	2.27*
Professional commitment	.17	1.04	−.12	2.05*
Hierarchic				
Total item score	−2.31	−2.82	−2.14	.46
Authority figures	.42	.29	.46	.52
Competitive games	−.17	−.47	−.07	.83
Competitive situations	−.94	−.89	−.95	.16
Assertive role	−1.44	−1.39	−1.47	.17
Imposing wishes	−.36	−.43	−.33	.24
Standing out from group	.58	.71	.54	.43
Routine administrative functions	−.40	−.64	−.32	.69

*$p<.05$
**$p<.01$

Table 7 also contains more detailed data on the administrative group. Those who take a universalistic view of the management process would anticipate that Form H, which differentiates managers from nonmanagers in hierarchic organizations, should do so in the professional context as well. The data do not support this expectation. Rather it is Form P that now differentiates the administrators, as the limited domain theories would anticipate. It should be emphasized, however, that the sample consists predominantly of low level administrators who are very close to the professional base in their organizations. Presumably they attain their positions because they closely approximate professional values and norms. Within the central administrations of large universities the hierarchic model may well be more applicable than the professional.

The data on academic administrators not only conflict with a universalistic conception of management process, but with certain recent findings derived from expectancy theory (Snyder, Howard, & Hammer, 1978). These latter findings indicate that a desire for power and authority predominates among academic department chairmen, and professors who do not hold administrative aspirations have a strong desire for autonomy. In Table 7, however, the administrators are not high on the imposing wishes subscale, and they are significantly higher (not lower) on the independent action subscale. The major differentiating source of motivation for the administrators appears to be accepting status. A possible explanation is that these differences in results are attributable to the conscious process (Miner, 1980b) aspect of expectancy theory, and the theories utilized here deal with motives below the conscious level.

A finding of some significance is that although the acquiring knowledge, accepting status, providing help, and professional commitment measures of the professional scale tend to correlate highly with university compensation, the independent action subscale is more closely associated with nonuniversity compensation. This suggests that the independent action measure might be a particularly effective predictor of success in private practice and that the other subscales may be somewhat more relevant for professional organizations and professional components of hierarchic systems.

Another point relates to the unexpectedly high age correlation obtained with the professional commitment measure, which in turn contributes to the total score results. It would appear logical that individuals with low professional commitment might selectively leave a profession over time, and in particular a professional organization such as the Academy of Management, so that predominantly high commitment people would remain in the older age groups. This type of explanation emphasizes selective retention rather than motivational change.

On the other hand, the research of Bucher and Stelling (1977) indicates that at least within the training period actual role playing of professional activities is the major factor influencing the development of professional identity and commitment. The role playing contributes to a sense of mastery of professional skills and knowledge, which in turn fosters commitment. Extrapolating these results out beyond the training process into the professional career, it seems possible that with increasing levels of experience in the work, commitment might continue to increase as well. At present, without further research, it is not possible to reach a conclusion on this matter.

The strong relationship between professional motivation and publication is consistent with the academic nature of the profession studied. However, it is somewhat surprising that books and book royalties yield higher validities than do the more research oriented journal articles, especially those of a prestige nature. A possible explanation is that in this field at the present time being "professional" does not always equate with science, research, and the like; it still may be more closely allied with a strong teaching, communicating emphasis.

CONCLUSIONS

One way of looking at the results of this study is in terms of their implications for the operation of professional organizations. The role of such organizations should be to contribute to the satisfaction of motives that tend to be strong among their members and that are closely related to professional career success. In terms of the professional motivational model presented, tested, and supported in this paper, this means that to be successful themselves, professional organizations should:

1. Foster the development and dissemination of knowledge to members, thus meeting the need to acquire knowledge.
2. Protect the freedom of members to act with professional independence, thus meeting the need for independent action.
3. Foster the prestige and status of the profession and of its individual members, thus meeting the need to accept status.
4. Create opportunities for members to serve clients, thus meeting the need to provide help.
5. Define a full-fledged profession with appropriate norms and values, thus meeting the need for professional commitment.

If one considers some of the more effective professional organizations currently in existence, it seems clear that the major activities of these organizations do indeed tend to mesh closely with these role prescriptions.

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Risk Taking Propensity of Entrepreneurs[1]

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The risk taking propensities of entrepreneurs of new ventures were objectively obtained using the Kogan-Wallach choice dilemmas questionnaire and were compared to those of managers and to normative data developed for the measurement instrument. The findings suggest that risk taking propensity may not be a distinguishing characteristic of entrepreneurs. They refute assumptions based on research that has been subjective and noncomparative and that used established entrepreneurs.

Palmer has suggested that psychological testing of entrepreneurs "be directed most toward the measurement of an individual's perception and handling of a risk" (1971, p. 38). The major purpose of the present research is to determine whether founders of new ventures and newly hired managers or newly promoted managers differ in their risk taking propensities. In order for this study to be understood completely, the varied definitions of the term "entrepreneur" must be presented and a functional definition for use in this study must be developed.

Webster's Third New International Dictionary (1961) defines an entrepreneur as "the organizer of an economic venture, especially one who organizes, owns, manages, and assumes the risk of a business." *Funk and Wagnall's Standard Dictionary* (1958) offers a similar definition. It states that an entrepreneur is "one who undertakes to start and conduct an enterprise or business, assuming full control and risks." Schumpeter (1954) credits J. S. Mill with bringing the term into general use among economists. Mill (1848) included as entrepreneurial functions direction, control, superintendence, and risk bearing. Mill appeared to believe that the inclusion of risk bearing distinguished the term "entrepreneur" from the term "manager."

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[1] A version of this paper was presented at the annual Academy of Management meetings, Kansas City, 1976. The author would like to thank Walter Nord, Raymond Hilgert, Jerome Steinman, and Barry Anderson of Washington University for their helpful comments and advice.

In his own writings, Schumpeter stressed that the role of innovation was of major importance in defining the entrepreneur. He placed less emphasis on the role of risk because he believed that both entrepreneurs and managers are subject to the risk of failure.

McClelland (1961) was less restrictive and did not require that the entrepreneur be the owner of the business. He believed that an innovative manager who has decision making responsibility is an entrepreneur. Thus in McClelland's terms a manager in a corporation can be entrepreneurial.

However, Hartmann's (1959) thorough historical discussion of the differences between entrepreneur and manager found that a useful distinction can be made. He supported Weber's (1947) concept, which considered the entrepreneur the ultimate source of all formal authority within the organization. Such a definition, Weber stated, distinguished the entrepreneur from the manager.

Most present day writers would consider the owner-manager of a business to be an entrepreneur. Today, it is further generally accepted that a person who provides capital would not be considered an entrepreneur if he did not also manage the venture. However, many authors, such as Collins and Moore (1964) and Hornaday and Aboud (1971) are even more restrictive in their studies and have examined only business ventures that were successful.

Although it should be noted that different definitions do exist, the definition to be used in this study does not prevent the review of the findings based on somewhat different definitions. However, previous findings based on different definitions may not be true for those defined as entrepreneurs in this study.

In this study, an entrepreneur is defined as a major owner and manager of a business venture who is not employed elsewhere. Such a definition allows for a more distinct comparison of the entrepreneur with the manager than would be obtained if managers with entrepreneurial-like positions were considered as entrepreneurs rather than managers. However, distinction between successful and unsuccessful entrepreneurs will *not* be made. Respondents were selected who very recently had made the decision to become owner-managers. For this reason, the validity of this study will not depend upon a venture's degree of success as would a study based upon entrepreneurs in business long enough to be considered successful or unsuccessful.

ENTREPRENEURIAL RISKS

Liles (1974) speculated about what he believed is at risk in a new venture. He suggested that in becoming an entrepreneur an individual risks financial well-being, career opportunities, family relations, and psychic well-being. The personal financial obligations that the entrepreneur makes to an unsuccessful enterprise can result in major losses to the entrepreneur as an individual and could jeopardize his future standard of living. Moreover, because the entrepreneur is likely to have devoted himself to the venture at a personal level, the failure of the venture becomes, in effect, the failure of the individual and therefore can have major emotional consequences.

Realizing that the financial and emotional consequences of failure could be devastating, Liles suggested that the potential entrepreneur is well advised to analyze carefully the risks associated with his specific business proposal and then to determine whether or not he is willing to undertake them. Liles concluded that the decision depends to a great extent upon the potential entrepreneur's perception of the risk involved.

Risk Preferences

Expectance theorists, especially Atkinson (1957), have stimulated much study of risk preferences. Atkinson's risk taking model is derived from the relationship that McClelland found between need for achievement and preference for moderate probabilities of success. Atkinson's model involves six variables: the subjective probability (i.e., expectance) of success (P_s), the subjective probability of failure (P_f), the incentive value of success (I_s), the incentive value of avoiding failure ($-I_f$), the achievement motive (M_s), and the motive to avoid failure (M_f). Atkinson assumed that I_s is a positive linear function of difficulty and can be represented by $(1-P_s)$. He assumed further that $-I_f$ is a negative linear function of difficulty and can be represented by $-P_s$. The variables are combined multiplicatively in the following equation: Resultant motivation $=(M_s \times P_s \times I_s) + (M_f \times P_f \times -I_f)$. The resultant motivation function has a maximum at $P_s = .5$ if M_s is greater than M_f. Where M_f is greater than M_s, the resultant motivation function would be a maximum either at the lowest value of P_s or the highest value of P_s.

The major prediction that follows from Atkinson's theory is that performance level should be greatest when there is greatest uncertainty about the outcome (when subjective probability of success is .50). This prediction should be true regardless of whether the motive to achieve or the motive to avoid failure is stronger within an individual. However, persons in whom the achievement motive is stronger should prefer intermediate risk, and those in whom the motive to avoid failure is stronger should avoid intermediate risk, preferring instead either very easy and safe undertakings *or* extremely difficult and speculative ones. This preference is based on the theory that an individual with a stronger motivation to avoid failure will tend either to succeed with the safe task or will be easily able to explain failure of a very speculative task without assuming personal blame, which he finds particularly painful.

McClelland (1961) has stated that the situations in which an individual's degree of control or skill is most important are moderately risky situations rather than very risky or very certain ones. According to McClelland, the individual needs no more than average ability to perform successfully the functions that fall within the limits of the safe end of the continuum, but no amount of skill can help in the situation of pure chance.

Entrepreneurial Risk Preferences

These three levels of risk preferences—low, intermediate or moderate, and high—could affect an individual's decision to start a business venture. Mancuso (1975) stated that individuals who are considered established entrepreneurs tend to be moderate risk takers, but he did not provide empirical support for his viewpoint, nor did he suggest what the propensity for risk taking might have been at the time the entrepreneurial decision was made. Perhaps in some instances, as the entrepreneur becomes more aware of his business environment, he realizes that the venture has been more risky than he originally perceived it.

As noted earlier, no studies have considered the risk taking propensity of individuals whose business ventures failed before becoming reasonably well established. These individuals may have considered their ventures to involve moderate or low risks, or they may have recognized the highly speculative nature of their proposed ventures and even believed that there was a greater likelihood for failure than for success. As stated above, if their motivation to avoid failure was very strong, they may have preferred to fail in a high-risk environment where failure could be explained without assuming personal blame, instead of in a more moderate risk setting, where they might more likely be blamed personally for failure. Previous researchers who studied established (and, therefore, at least moderately successful) entrepreneurs may have eliminated from their studies those entrepreneurs who chose high-risk ventures and failed, as well as those who started what they considered to be low-risk ventures and failed.

Although previous research has not specifically compared the risk taking propensity of individuals who decided to start their own business venture with that of individuals not so inclined, research conducted by Meyer, Walker, and Litwin (1961), studied "managers" of shop operations in manufacturing plants and "staff specialists" to determine the relationship between measured motive patterns of individuals and their adjustment to particular job roles. The authors hypothesized that managers in jobs with definite entrepreneurial characteristics would score higher on a measure of need for achievement than would specialists whose jobs were nonentrepreneurial. Further, they hypothesized that in situations requiring decisions involving risk, the "entrepreneurs" would prefer risks with odds of success near 50-50, because previous research had shown this preference to be associated with achievement motivation. The study found that managers selected to represent the entrepreneurial role did show greater preference for intermediate risks on a risk preference questionnaire than did specialists of comparable age, education, and job level.

If managers holding positions with entrepreneurial characteristics have greater preferences for moderate level risks than do specialists whose jobs are nonentrepreneurial, then perhaps these findings can be generalized to include actual entrepreneurs. The writings previously referred to may suggest that actual entrepreneurs have a stronger preference for moderate risks. However, it is conceivable that the preference for moderate level risk is not associated with actual ownership of a business but rather with the managerial demands of any job. If this conjecture is true, then there should not be a significant difference in risk taking propensities between owner-managers and managers whose jobs are entrepreneurial with the exception of ownership.

Entrepreneurial literature since the writings of Mill has included risk bearing as a major distinguishing characteristic between the functions of a manager and those of an entrepreneur. Entrepreneurial risk can be divided into three components: the general risk taking propensity of a potential entrepreneur, the perceived probability of failure for a specific venture, and the perceived consequences of failure. Because the latter two components require intimate knowledge of the specific venture before they can be evaluated, a study based on them would be very difficult and very likely subject to uncontrolled independent variables. However, the general risk taking propensity of the entrepreneurs and managers can be compared empirically to determine whether this component of risk distinguishes entrepreneurs from managers.

Definition of Risk Taking Propensity

For the purpose of this study, the propensity for risk taking is defined as the perceived probability of receiving the rewards associated with success of a proposed situation, which is required by an individual before he will subject himself to the consequences associated with failure, the alternative situation providing less reward as well as less severe consequences than the proposed situation. Such a definition might best describe the situation that faces the potential entrepreneur when he decides to establish a new business venture.

METHOD

Participants

The study was conducted using three groups of participants. One group was composed of individuals who within the three months prior to the study ceased working for their employers and at the time of the study owned as well as managed business ventures. Because their businesses had not existed long enough to have failed, a broad spectrum of entrepreneurs is included, i.e., those who will be successful and those who will be unsuccessful.

The entrepreneurial group was compared with two groups of managers who were similar otherwise to the entrepreneurs. Members of both groups of managers also had changed positions within three months prior to the study. One group of managers had changed organizations, and the other had only changed positions within an organization.

This study initially involved only these three groups, and a comparison of the entrepreneurs with a more general population was not planned prior to the study. However, after the initial data analysis was conducted, comparison with a more generalized population seemed desirable. The normative data obtained by Kogan and Wallach (1964) was used as the best available data approximating the general population.

Measurement Instrument

Wallach and Kogan (1959, 1961) developed the choice dilemmas questionnaire (CDQ) to obtain probability preferences in everyday life situations. On this test a subject is presented with 12 hypothetical situations. Each item requires the respondent to choose between a safe alternative and a more attractive but risky one. In addition, the respondent is asked to indicate the probability of success sufficient for him to select the risky alternative. A typical item is:

> Mr. A, an electrical engineer, who is married and has one child, has been working for a large electronics corporation since graduating from college five years ago. He is assured of a lifetime job with a modest, though adequate, salary, and liberal pension benefits upon retirement. On the other hand, it is very unlikely that his salary will increase much before he retires. While attending a convention, Mr. A is offered a job with a small, newly founded company which has a highly uncertain future. The new job would pay more to start and would offer the possibility of a share in the ownership if the company survived the competition of the larger firms.
>
> Imagine that you are advising Mr. A. Listed below are several probabilities or odds of the new company's proving financially sound.
>
> Please check the lowest probability that you would consider acceptable to make it worthwhile for Mr. A to take the new job.
>
> ________ The chances are 1 in 10 that the company will prove financially sound.
> ________ The chances are 3 in 10 that the company will prove financially sound.
> ________ The chances are 5 in 10 that the company will prove financially sound.
> ________ The chances are 7 in 10 that the company will prove financially sound.
> ________ The chances are 9 in 10 that the company will prove financially sound.
> ________ Place a check here if you think Mr. A should *not* take the new job no matter what the probabilities.

The items contained in the CDQ are not in any respect a representative sample of all possible items in the universe. Therefore, instruments similar to the CDQ could readily be constructed. There is no basis known for the creation of any other possible scale as a measure of risk taking propensity. The CDQ score summarizes the responses made to a particular set of 12 choice dilemmas. A maximum score of 120 is possible, and 12 is the minimum score. Lower scores are associated with less conservatism in risk taking situations.

Kogan and Wallach (1964) reported reliabilities of .53 for the men and .62 for women using odd-even coefficients stepped up by the Spearman-Brown formula and considered to be adequate.

Items from the CDQ have been extensively used by researchers of risk taking propensity. Unfortunately, all reported research in the United States that utilized all of the items has used college students or elderly persons as subjects. Thus a comparison of the results of the present research with the results of previous research is necessarily of limited value.

However, after a thorough search of the literature, it was concluded that the most widely used and most appropriate instrument for the present research was the CDQ, despite its limitations. The limitations were determined to be of less importance because the primary purpose for inclusion of this instrument was to measure the relative differences between groups.

Procedure

The businesses whose owners served as participants were selected from the listing of businesses licensed by St. Louis County, Missouri, during the months of August and September 1975.[1]

From this total listing of businesses, branch outlets of existing businesses were eliminated. Also eliminated were businesses that had been established previous to August but had recently relocated and were being licensed to do business at the new location. After this elimination procedure, the names of 93 businesses remained.

Each of these businesses received a letter informing the owner of a meeting to be offered at four different times at the School of Business and Administration of Saint Louis University. One purpose, stated in the letter for the meeting, was to gather information anonymously about the beliefs, attitudes, and background of the business owners. The second purpose mentioned was to allow the owners to meet one another socially and exchange information.

Each business was contacted by telephone to see if the owner would attend one of the meetings. If a business had more than one owner, the first one contacted by telephone was the only one who was considered for this study. Furthermore, if the owner was employed elsewhere he was eliminated from this study.

A total of 58 questionnaires were either provided during the meetings or mailed to those entrepreneurs unable to attend a meeting. Of these, 31 were completed in usable form. Five others were returned but were not completed as requested and therefore were disregarded.

The names of managers were obtained from St. Louis area newspaper articles that deal with personnel changes. Only one manager per organization was asked to serve as a participant. These managers received letters similar to those sent to the entrepreneurs except that these letters stated that managers were the focal point of the meetings.

A total of 106 questionnaires were either provided during the meetings or mailed to managers unable to attend any of the sessions. Of the 51 questionnaires provided to the promoted managers, 38 were returned but 3 were not correctly completed, leaving 35 in usable form for the study. Of the 55 managers who had joined a new organization, 40 returned questionnaires but 4 did not complete them correctly, leaving 36 in usable form.

To allow both managerial groups to be equal in size to the group of entrepreneurs, four questionnaires from individuals promoted within an organization and five questionnaires from individuals who had recently joined a new organization were randomly selected and eliminated from further data analysis.

It was necessary to determine whether significantly different results would have been obtained if all of the participants had responded. To make this assessment, two procedures were used.

First, the data provided by each primary group of respondents who attended the meetings was compared with the data for the same primary group of respondents who mailed in their responses. No significant differences were found to exist between either segment of any of the three groups. Second, the types of businesses and/or positions held by respondents of each primary group were compared with those of nonrespondents for each primary group. Once again no apparent differences were observed. However, these comparisons do not assure that similar results would definitely have been obtained had all participants responded.

RESULTS

The null hypothesis developed for this study is presented below:

Individuals who, within the past three months, have ceased working for their employers and now own as well as manage business ventures, will have the same risk-taking propensity as will

a) individuals who, within the past three months, have ceased working for their employers and now are managers for different employers, and

b) individuals who, within the past three months, have assumed new managerial positions with the same firms with which they have been associated for a year or more.

In order to test the hypothesis, data from the Kogan-Wallach CDQ were used. The mean CDQ score for the entrepreneurs was 71, while the transferred managers' mean score was 72.52, and the promoted managers' mean score was 66.97 (Table 1).

TABLE 1
Means and Standard Deviations on Kogan-Wallach Choice Dilemmas Questionnaire

Group	*Number of Respondents*	*Mean*	*Standard Deviation*
Entrepreneurs	31	71.00	11.94
Transferred managers	31	72.52	12.19
Promoted managers	31	66.97	10.84

TABLE 2
Summary of Analysis of Variance on Kogan-Wallach Choice Dilemmas Questionnaire

Source of Variation	*df*	*SS*	*MS*	*F*	*Level of Significance*
Between group	2	509.87	254.94	1.87	.1579
Within group	90	12262.71	136.25		
Total	92	12772.58			

If the range of differences among the three group means was similar to the range reported by Kogan and Wallach (1964), there is a 73 percent probability that it would have been discovered. This probability of detection or "power" of the statistical test was based on the range of means reported by Kogan and Wallach, 3 groups of 31 participants each and a Type I error of 5 percent. Although no generally accepted convention for significant power value exists, Cohen (1969) recommended 80 percent but noted that values larger than 60 percent should be considered acceptable. It therefore is concluded that if a difference in risk taking propensity had existed it probably would have been discovered.

A one-way analysis of variance test (Table 2) indicated that the CDQ scores of the three groups were not significantly different from each other. Therefore, the null research hypothesis was accepted in its entirety; the entrepreneurs appear to have the same risk taking propensity as managers.

In order to understand more fully the significance of risk taking propensity as it relates to the decision to start a business venture, additional exploratory analysis was conducted using the CDQ scores of the entrepreneurs together with the mean scores and standard deviations reported by Kogan and Wallach (1964) for 114 undergraduate male students and 103 undergraduate female students.

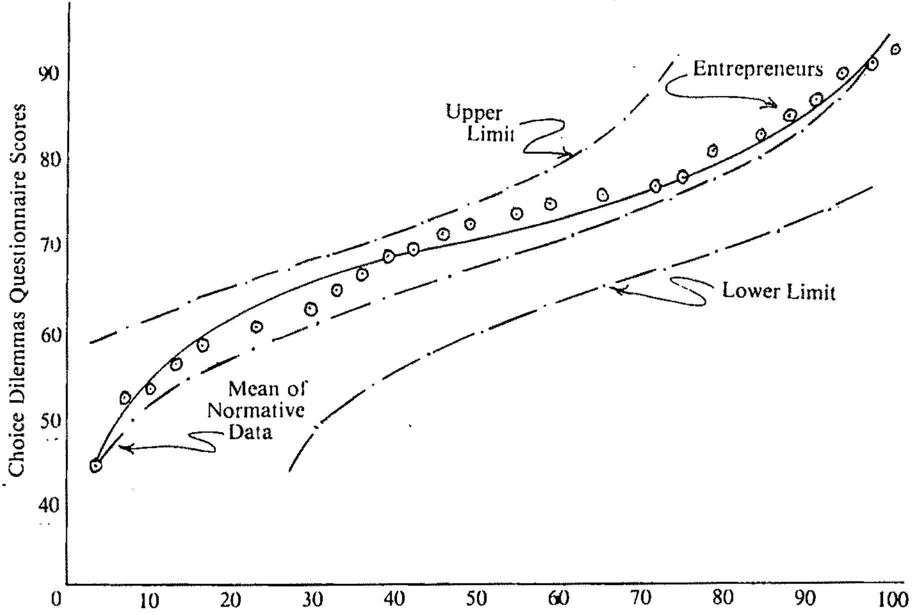
The chi-squared test of significance indicates that no significant difference exists at the .25 level of confidence between the distribution of the entrepreneurs' scores and those scores obtained from the Kogan-Wallach study, assuming normal distribution for the Kogan-Wallach data.

A Kolmogorov confidence band with a confidence coefficient of 95 percent was established using the data reported by Kogan-Wallach and assuming that the data were normally distributed. All individual scores for entrepreneurs were found to lie within this band, as illustrated in Figure 1. It therefore is concluded that the distribution of risk taking propensity held by entrepreneurs is the same as the distribution of risk taking in the general population, i.e., the population used by Kogan-Wallach to establish norms for the CDQ instrument.

DISCUSSION

The failure of risk taking propensity to distinguish entrepreneurs from managers appears to be a major deviation from the widely reported theory

FIGURE 1
Kolmogorov Confidence Band Based on Kogan-Wallach's CDQ Data and Plot of Entrepreneurs' CDQ Scores



that entrepreneurs are the more moderate risk takers. However, the failure to find differences does not imply that entrepreneurs are not moderate risk takers. In fact, a comparison of the responses on the CDQ of the entrepreneurs and the managers who participated in this study with data from the original Kogan and Wallach (1964) study revealed that both groups were best described as moderate risk takers because their scores were clustered around the mean score reported by Kogan and Wallach.

However, if the *entire* range of scores obtained from entrepreneurs in this study are compared to the *entire* range of scores obtained in the Kogan-Wallach study an interesting comparison can be made: Figure 1 consists of a plot based on the scores obtained by entrepreneurs in this study compared with plots based on the Kogan-Wallach studies that were used to establish normative data. (The Kogan-Wallach plots were obtained by using the reported mean and standard deviations, and it is assumed that the Kogan-Wallach data were normally distributed.) This Kolmogorov confidence band indicates that the distribution of entrepreneurs' scores from this study and that of Kogan-Wallach subjects are not significantly different at the .05 level of confidence. In other words, the distribution of the risk taking propensity of the entrepreneurs of new ventures is similar to the distribution of risk taking propensity found to exist by Kogan and Wallach in a more general population. Thus, the data in this study indicate that the level of risk taking propensity does not distinguish new entrepreneurs either from managers or from the general population.

Just as the majority of the established entrepreneurs who were interviewed in earlier studies, such as Mancuso's (1975) study, expressed a desire for moderate levels of risk, over 64 percent of the entrepreneurs in this current study were found to have a propensity for moderate levels of risk, as indicated by their CDQ scores' being within one standard deviation of the mean for the Kogan and Wallach subjects. However, by definition, approximately 68 percent of the general population also would be expected to have scores in this range. Thus earlier studies concerned with the entrepreneurs' risk taking propensity may have *correctly* found the majority of entrepreneurs to have a tendency toward moderate levels of risk, but they may have failed to recognize that this same characteristic is also true of the population in general. Therefore, although a majority of the entrepreneurs of established ventures may in fact have preferred moderate levels of risk, this preference need not be a distinguishing characteristic. But even this statement must be followed with several cautions.

Because this study dealt with entrepreneurs of new ventures, it is possible that the risk taking propensity of established entrepreneurs might differ from that of a new entrepreneur. This difference might occur for several reasons. First, the process of being an entrepreneur may increase the desire for moderate levels of risk, thus causing a larger percentage of established entrepreneurs to appear to be moderate risk takers. Furthermore, those entrepreneurs who have a propensity for low or high levels of risk may tend to cease to be entrepreneurs at a greater rate than do those who have a propensity for moderate levels of risk. An additional source of error is introduced by certain difficulties already mentioned in using the data reported by Kogan and Wallach for comparison with data collected for this study.

Despite the limitations of this present study and the need for additional research, the finding that general risk taking propensity does not distinguish entrepreneurs from nonentrepreneurs, if confirmed by future research, would result in the revision of the importance of a variable that is widely accepted as an entrepreneurial characteristic.

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The Determinants of Computer Based Information System Performance

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Computer based information system performance can be conceptualized as being a function of computer hardware and software, behavioral, structural, and environmental variables. To explore this conceptual model, data were collected from 108 private and governmental organizations. The data provide useful insights into the determinants of computer based information system performance.

Computer based information systems (CBIS) have become increasingly important to contemporary organizations. As Steiner has stated it, "Information flows are as important to the life and health of a business as the flow of blood is to the life and health of an individual" (1969, p. 475). High performance information systems can do much to promulgate organizational success.

Most discussions of CBIS performance are intertwined with or focus on computer hardware and software (Withington, 1974). Such an emphasis is not surprising because much of what is associated with high performance is often made possible by advanced technology. Behavioral variables also influence information system performance. A variety of research indicates that interactions among individuals and groups are important (Swanson, 1974; Doll, Abdullah, Mansour, Trotta, & Shamrock, 1976). Also shown to affect performance are structural variables (Reif & Monczka, 1973; Baum & Burack, 1969). Other influences on performance are environmental variables (Burdeau, 1974; Seaburg & Seaburg, 1973).

The present article focuses on the findings of a large, cross-organizational study. Investigated was the impact that computer hardware and software and behavioral, structural, and environmental variables have on CBIS performance.

THE CONCEPTUAL MODEL

Information systems are a product of multiple factors. Conceptually, many scholars in the field recognize this fact, but most research has tended to focus on only a few variables at a time (Lucas, 1978; Swanson, 1974; Watson, Sprague & Kroeber, 1977a, 1977b). Most CBIS literature has centered on technical aspects of the system (Awad, 1977; Lecht, 1977; Nolan, 1973; Wilkinson, 1973; Withington, 1975). There exists, however, an awareness that behavioral (Mason & Mitroff, 1973; Schewe, 1976; Swanson, 1974), structural (Albrecht, 1973; Reif & Monczka, 1973; Zirkle, 1977) and environmental (Burdeau, 1974; Bruenberger, 1972; Holland, Kretlon, & Ligon, 1974) variables are important. What has been lacking is empirical, multiple variable research into the determinants of CBIS performance.

The conceptual model employed in this study is:

CBIS performance = *f*(Computer hardware and software,
behavioral, structural, and
environmental variables)

In the case of CBIS performance and computer hardware and software, the variables used in a previous study were employed (Kroeber, 1976; Watson et al., 1977a, 1977b). These variables were determined from literature references and input from a panel of experts. The same procedure was used to obtain the behavioral, structural, and environmental variables employed in this study. The variables in each category were as follows:

CBIS performance variables

1. The applications performed
2. The degree of integration in the data base
3. The decision function provided by decision models
4. The organizational levels served
5. The interfaces between system elements

Computer hardware and software variables

1. The capabilities of the CPU
2. Data entry capabilities
3. Storage media and devices
4. Output capabilities
5. Other available technology

Behavioral variables

1. The degree of top management involvement in system development
2. Top management's knowledge of computers
3. The effectiveness of relationships between computer specialists and other organizational personnel
4. The amount of resistance to change by organizational personnel
5. The quality and quantity of computer specialists

Structural variables
1. The organizational placement of the data processing function
2. The frequency with which educational programs are offered to end users
3. The availability of interactive computing
4. The length of time the organization has operated a CBIS

Environmental variables
1. The amount of competition the organization faces in the marketplace
2. The variety of products or services offered by the organization
3. The frequency with which the organization offers new products or services
4. The amount of customer requirements
5. The amount of external regulation

It is important to recognize that the correct placement of variables into each category was not always clear and that some judgment, perhaps even of a somewhat arbitrary nature, had to be made. For example, it is not obvious how to categorize the frequency with which training programs are offered to end users. Consequently, the study's findings in regards to the four categories must be interpreted in light of the variables that were placed in each.

METHOD

Method of Inquiry

The method of inquiry was a survey sample of the population of users of CBIS in engineering, finance, manufacturing, retail/wholesale, service, and government. The survey instrument was a questionnaire designed to provide data to explore the conceptual model described previously. The questionnaire was mailed to organizations that participated in a previous study dealing with CBIS (Watson et al., 1977a, 1977b). Of these, 108 responded and were categorized as follows: 11 engineering, 13 finance, 30 manufacturing, 12 retail/wholesale, 11 service, and 31 governmental agencies.

Selection of Variables

A survey of the literature with regard to variables that have an impact upon CBIS performance served as a starting point in identifying study variables and grouping them in appropriate categories. A large and comprehensive list of variables was prepared for each category. The lists of variables then were mailed to a panel of experts in the field of CBIS. Six experts participated in this study. Three were practitioners and three were academicians in the CBIS field. The questionnaire contained four sections. The first section asked the experts to assign weights to the variables included in CBIS performance and computer hardware and software. The purpose of this section was to validate the variables and weights for the variables used by Watson et al. (1977a, 1977b). This check revealed no significant differences between the variables and weights from Watson, Sprague and Kroeber's research and the data provided by the panel of experts.

The other sections of the experts' questionnaire dealt with the three lists containing the behavioral, structural, and environmental variables obtained from the literature search. Each expert was asked to consider the influence of each list on performance separately and then was asked to: (1) add more variables to each list if deemed appropriate; (2) assign zero weights to variables thought to be unimportant; (3) indicate whether some variables were redundant or overlapping and, therefore, should be combined, (4) assign a percentage weight to each variable in the finalized list and, finally, (5) provide suggestions or comments with regard to the study in general.

Some of the experts added new variables and deleted or combined others. After studying the experts' weights, suggestions, and comments carefully, new lists of variables for each category were prepared using the following criteria: (1) variables that had the highest average weights were selected for inclusion in the study, and (2) inclusion of variables in each list was terminated when the weights of the selected variables accounted for at least 80 percent of the total weight. The final list of variables included five, four, and five variables in the behavioral, structural, and environmental categories, respectively. A final set of weights for the variables in each category was obtained from a second experts' questionnaire. The weights of all of the variables used in the study are shown in Table 1.

Measurement

The same organizations surveyed by Watson et al. (1977a, 1977b) in their study of the relationship of computer hardware and software to CBIS performance were used in this study. This made it possible, with appropriate updating for recent changes, to use their data. Consequently, data were obtained from participating organizations for the (1) behavioral variables, (2) structural variables, (3) environmental variables, and (4) updates to CBIS performance and computer hardware and software.

Ordinal scaling was used to measure the variables in each category. For example, five ordinal answers were listed for the question that asked for the assessment of the degree of top management's involvement in the ongoing development of the organization's CBIS. No involvement made up the low end of the scale and was assigned a value of 1. Very high involvement was assigned a value of 5. Similar scaling and quantification were used to measure all variables in the study.

Given the weights for the variables obtained from the panel of experts and the quantified organizational data, it was possible to obtain a summary for CBIS performance, behavior, structure, and environment. These figures were developed for each organization by multiplying the variable

TABLE 1
Experts' Weights

	Weights
CBIS performance variables[a]	
1. The applications performed	.30
2. The degree of integration in the data base	.20
3. The decision function provided by decision models	.20
4. The organizational levels served	.20
5. The interfaces between system elements	.10
	1.00
Computer hardware and software variables[a]	
1. The capabilities of the CPU	.30
2. Data entry capabilities	.15
3. Storage media and devices	.25
4. Output capabilities	.10
5. Other available technology	.20
	1.00
Behavioral variables	
1. The degree of top management involvement in system development	.32
2. Top management's knowledge of computers	.14
3. The effectiveness of relationships between computer specialists and other organizational personnel	.18
4. The amount of resistance to change by organizational personnel	.10
5. The quality and quantity of computer specialists	.26
	1.00
Structural variables	
1. The organizational placement of the data processing function	.19
2. The frequency with which educational programs are offered to end users	.18
3. The availability of interactive computing	.24
4. The length of time the organization has operated a CBIS	.39
	1.00
Environmental variables	
1. The amount of competition the organization faces in the marketplace	.32
2. The variety of products or services offered by the organization	.16
3. The frequency with which the organization offers new products or services	.14
4. The amount of customer requirements	.21
5. The amount of external regulation	.17
	1.00

[a] These variables and their weights were obtained from the Watson et al. (1977a, 1977b) study.

weights times the corresponding quantified variable values. These figures became inputs to the regression analysis that was used in developing the study's findings.

FINDINGS

Private business data were analyzed separately from governmental data. Therefore, two models were tested: one for private business organizations and one for governmental organizations. For the private business model, the full conceptual model described previously was used. In the case of the governmental model, the environmental variables were excluded because of their lack of relevance for governmental organizations, given the way the environmental variables were defined. Governmental organizations function in an environment that is much different from that faced by private business organizations. Even among governmental organizations (e.g., national defense, welfare, agriculture) there are considerable differences. In order to explore fully the impact of environmental variables on CBIS performance in governmental organizations, it would be necessary to categorize the different types of governmental organizations, develop appropriate environmental variables for each category, and collect data from organizations in the different categories. Such an undertaking was left for future research.

Private Business Model Results

Stepwise regression results indicated that the model was a good predictor of performance. Table 2 summarizes the results of the stepwise regression analysis and the statistics for each variable entering regression. The strongest predictor of CBIS performance was structure, followed by computer hardware and software, and then environment. Behavior was the weakest predictor and did not enter the regression, although it came close to entering and therefore could be regarded as a marginal predictor. The *F*-ratios ranged from 8.78 (environment) to 57.25 (structure). The coefficient of determination (R^2) obtained in step 1 was .433 and by step 3, when the last variable entered (environment), it was .574. These results were significant at the .01 level.

A cross validation procedure was employed to validate the model. A Pearson correlation coefficient (r) of .703, which was significant at the .01 level, was obtained, which indicated high model validity.

TABLE 2
Stepwise Regression: Private Business Model[a]

Performance = f(computer hardware & software, behavior, structure, environment)
(n = 77)

Variable(s) entered on
Step 1: Structure

Multiple R	= .658	Simple r	= .658
R^2	= .433	F-ratio	= 57.25
Standard Deviation	= 13.09	Beta	= .379
Significance = .01			

Step 2: Computer hardware & software

Multiple R	= .723	Simple r	= .583
R^2	= .523	F-ratio	= 40.58
Standard Deviation	= 12.09	Beta	= .263
Significance = .01			

Step 3: Environment

Multiple R	= .758	Simple r	= .588
R^2	= .574	F-ratio	= 8.78
Standard Deviation	= 11.50	Beta	= .326
Significance = .01			

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[a] Behavior did not enter, but came close (marginal), with an F-ratio of 3.783 (min. $F = 3.99$ to enter).

Government Model Results

Stepwise regression results indicated that the government model was a weak predictor of CBIS performance. Table 3 summarizes the results of the stepwise regression analysis and the statistics for each variable entering regression. Only computer hardware and software entered the regression, with an F-ratio of 9.44 and R^2 of .246. These results were significant at the .05 level.

Due to the smallness of the governmental sample size ($n=31$), no model validation was conducted.

Organizational Category Ratings

The mean scores for each organizational category were computed. The mean CBIS performance ratings are shown in Table 4. Manufacturing organizations had the highest mean performance followed by service, government, engineering, finance, and retail/wholesale. Only finance and retail/wholesale categories were found to be significantly different from the rest (at the .90 and .95 level, respectively).

TABLE 3
Stepwise Regression: Government Model[a]

Performance = f(computer hardware & software, behavior, structure)
($n=31$)

Variable(s) entered on
Step 1: Computer hardware & software

Multiple R	= .4956	F-ratio	= 9.442
R^2	= .2456	Standard Deviation	= 14.52
Simple r	= .4956	Significance	= .05

[a] Behavior and structure did not enter. However, structure had an F-ratio of 3.72 (need at least 4.21 to enter) and was significant at .064.

TABLE 4
Mean Performance and Computer Hardware and Software Scores

Category	*Mean Performance*	*Significant at*		*Mean Computer Hardware & Software*	*Significant at*	
		.90	*.95*		*.90*	*.95*
Engineering ($n=11$)	56.6	No	No	49.2	No	No
Finance ($n=13$)	53.2	Yes	No	47.5	Yes	No
Manufacturing ($n=30$)	59.9	No	No	53.3	No	No
Retail/Wholesale ($n=12$)	48.9	Yes	Yes	47.1	Yes	No
Service ($n=11$)	59.3	No	No	58.3	No	No
Private ($n=77$)	(56.7)	—	—	(53.2)	—	—
Government ($n=31$)	58.9	No	No	58.3	Yes	No
Total ($n=108$)	57.2	—	—	54.6	—	—

TABLE 5
Mean Behavior Scores

Category	Top Management Involvement	Top Management Knowledge	Effectiveness of Relationships	Resistance to Change	Quantity & Quality of Personnel	Total	Significant at	
							.90	.95
(Maximum)	(32)	(14)	(18)	(10)	(26)	(100)	—	—
Engineering (*n* = 11)	19.2	7.7	12.5	6.7	16.5	62.6	No	No
Finance (*n* = 13)	24.1	10.1	16.5	6.9	17.3	70.9	Yes	No
Manufacturing (*n* = 30)	19.9	7.5	13.0	6.6	15.0	62.0	No	No
Retail/Wholesale (*n* = 12)	21.9	9.0	13.0	6.5	15.9	66.3	No	No
Service (*n* = 11)	19.8	7.3	13.6	6.4	15.0	62.1	No	No
Private (*n* = 77)	(21.0)	(8.3)	(12.9)	(6.6)	(15.9)	(64.7)	—	—
Government (*n* = 31)	17.2	8.8	12.4	6.8	14.3	59.5	Yes	No
Total (*n* = 108)	19.9	8.4	12.8	6.7	15.4	63.2	—	—

Mean computer hardware and software ratings also are shown in Table 4. Service and government organizations had the highest ratings, followed by manufacturing, engineering, finance and retail/wholesale. Finance and retail/wholesale organizations were found to be significantly different from the rest at the .90 level.

Mean behavioral ratings are shown in Table 5. Finance organizations had the highest rating followed by retail/wholesale, engineering, service, manufacturing, and government. Finance was significantly higher (.90 level) than private businesses.

Mean structure ratings are shown in Table 6. Finance organizations had the highest rating, followed by manufacturing, service, retail/wholesale, government, and engineering. Finance was significantly higher (.90 level) than the rest, and government was significantly lower (.90 level) than private businesses.

TABLE 6

Mean Structure Scores

Category	*Location of Data Processing Department*	*Educational Programs*	*Interactive Computing*	*Experience in CBIS*	*Total*	*Significant at*	
						.90	*.95*
(Maximum)	(19)	(18)	(24)	(39)	(100)	—	—
Engineering ($n=11$)	12.9	9.8	15.3	17.7	55.7	No	No
Finance ($n=13$)	13.9	11.1	17.8	23.4	63.2	Yes	No
Manufacturing ($n=30$)	13.5	9.4	16.3	21.6	60.8	No	No
Retail/Wholesale ($n=12$)	13.5	9.5	14.7	18.8	56.5	No	No
Service ($n=11$)	14.2	11.4	14.5	20.6	60.7	No	No
Private ($n=77$)	(13.6)	(10.0)	(15.9)	(20.8)	(60.3)	—	—
Government ($n=31$)	15.0	9.7	15.0	15.6	56.3	Yes	No
Total ($n=108$)	14.0	9.9	15.9	19.3	59.1	—	—

Mean environmental ratings are shown in Table 7. Manufacturing organizations had the highest rating, followed by retail/wholesale, finance, engineering, and service. Manufacturing was significantly higher (.90 level) than the rest, and service was significantly lower (.90 level) than the rest.

IMPLICATIONS OF THE STUDY

The study findings have practical implications for management. They clearly show that although computer hardware and software are important to a high performance CBIS, behavioral, structural, and environmental variables also are important. Organizations that operate a CBIS should review and continually monitor these variables in order to achieve high performance.

TABLE 7
Mean Environmental Scores[a]

Category	Level of Competition	Product Variety	New Products	Customer Requirements	External Regulations	Total	Significant at .90	Significant at .95
(Maximum)	(32)	(16)	(14)	(21)	17	(100)	—	—
Engineering ($n=11$)	27.2	9.8	7.7	13.4	11.4	69.5	No	No
Finance ($n=13$)	29.5	7.7	12.2	17.2	7.0	73.6	No	No
Manufacturing ($n=30$)	28.4	10.4	11.5	14.2	12.7	77.2	Yes	No
Retail/Wholesale ($n-12$)	29.4	7.0	10.5	16.3	12.3	75.5	No	No
Service ($n=11$)	24.3	7.3	9.8	13.3	11.9	66.6	Yes	No
(Private)	(28.0)	(8.9)	(10.7)	(14.8)	(11.3)	(73.7)	—	—

[a] Environmental variables not included for governmental organizations.

In both the private business and government models, computer hardware and software were found to be related to CBIS performance. This is to be expected. Fast CPU's, large storage capacities, sophisticated operating systems, and the like make it possible to do much of what is associated with high performance. The study's findings also show the importance of other variables. Consequently, it seems most appropriate to view computer hardware and software as a facilitator of high CBIS performance, but normally not sufficient by itself.

The private business model clearly shows the importance of structural variables. The findings suggest the merits of an independent location for the data processing department in order to realize high performance, the value of educational programs for end users, and the utility of an interactive computing capability. The length of time that the organization has operated a CBIS was included as a variable, as it typically takes time to evolve a high performance CBIS.

In the private business model, environmental variables were found to be related to CBIS performance. In general, organizations have little choice but to react to their environment, because only in rare cases can they significantly affect it. Still, it is useful to understand that competitive pressures, the variety of products or services offered, governmental regulations, and customer requirements do indeed affect CBIS performance.

Behavioral variables are at least marginally related to CBIS performance. The private business model findings indicate that top management involvement, knowledge of computers, the adequacy of the quantity and quality of CBIS personnel, the amount of resistance to change, and the effectiveness of the relationship between system personnel and others in the organization have an impact on system performance.

It is noted that behavioral variables were not found to be as strongly related to CBIS performance as might have been expected, given the numerous articles discussing their importance. This finding is not easily explained. It may be that advanced computer hardware and software, carefully designed structural relationships, and a demanding external environment lead to a high performance CBIS. Perhaps behavioral problems only temporarily impede system development efforts, but over time these difficulties are overcome and high performance is possible.

The summarized industry data are potentially useful for industry leaders who want to make cross-industry comparisons. Such comparisons might pinpoint areas in which industry improvement is needed. At the individual firm level, comparisons can be made between the organization and the summarized data for its industry counterparts. Materials for scoring an organization's CBIS performance, computer hardware and software, behavior, structure, and environment are available elsewhere (Mansour, 1978). Once again, much like with accounting ratios, areas for potential improvement can be identified from such comparisons.

SUMMARY AND CONCLUSIONS

A model was conceptualized and tested for the purpose of investigating the determinants of computer based information system performance. The model hypothesized that CBIS performance is related to computer hardware and software, behavioral, structural, and environmental variables. For governmental organizations, environmental variables were not deemed relevant in the same manner as for private business organizations and, hence, were not tested.

The findings indicate that the private business model is a good predictor of CBIS performance. Organizational structure was the best predictor, followed by computer hardware and software, and then environment. The behavioral variables were the weakest predictor of performance. It should be emphasized that these findings are valid only to the extent of the variables included in each category. For example, the behavioral category contained five weighted variables for which some arbitrary judgment was exercised in their groupings. Also, the structure category was a result of four weighted variables, some of which it can be argued belong to the behavior category. This limitation must be recognized before one can dismiss the importance of behavioral variables in influencing CBIS performance.

In the governmental model, only computer hardware and software entered regression. Structural and behavioral variables can be considered only as marginal and weak predictors of performance, respectively. Again, the same limitation mentioned earlier in the private business model applies here. In addition, the sample size was considerably smaller than for the private business model. Another limitation is that no attempt was made to stratify governmental agencies into their various types. An increase in the sample size and stratification would have helped improve the analysis.

Differences were noted among organizational categories. Manufacturing, service, and governmental organizations were high in both CBIS performance and computer hardware and software. Financial organizations rated high on the behavioral and structural variables, and manufacturing firms had high environmental scores.

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Analysis and Prediction of Top National Union Officers' Total Compensation[1]

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Relationships among, and correlates of, the total compensation of the top three officers in the 100 largest national unions were examined in three time periods (1962, 1967, 1973). Results were highly stable over time and for the most part bore a resemblance to results from studies on compensation for top business executives.

The nature and the correlates of top executive compensation have been extensively investigated in two types of research. The first has been an analysis of the pay structure for top executives, usually the three top executives. It has been found that there are very decided compensation differentials among such executives, usually about 30 percent between adjacent levels or ranks (Mahoney, 1979; Patton, 1965). For example, Patton (1965) found that as a percentage of the chief executive's compensation, the second and third officers' compensations were 72 percent and 58 percent, respectively, in 1964. Mahoney (1979) found that individuals also perceive as appropriate a differential of about 30 percent between adjacent high levels.

These salary differentials also appear to be quite stable. The differentials reported by Patton for 1964 were identical to the differentials in existence 11 years previously (Patton, 1965). In short, the evidence on pay structures suggests a very pronounced, stable pay structure among top executives.

A second stream of research has investigated significant correlates of top executive compensation, usually focusing on the chief executive officer. Numerous indices of *ability to pay* have been examined in this

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regard. They include such factors as profit, assets, sales, rate of return, and size (Agarwal, 1979; Lewellen & Huntsman, 1970; McGuire, Chiu, & Elbing, 1962; Masson, 1971; Motamedi, 1979; Roberts, 1956; Wallace, 1976). In general, ability to pay variables are strong predictors of top executive compensation. Their relative predictive importance, however, depends on such factors as industrial concentration and type of ownership control (Wallace, 1976).

Job complexity also may be associated with top executive compensation. Agarwal (1979) found that the span of control, number of management levels below the executive, and geographical diversity of operations were significantly related to top executive compensation in the life insurance industry.

Recently there has been interest in examining the correlates of union officer compensation. This research has been greatly aided by the availability of union financial information through the financial record keeping and reporting requirements of the Landrum-Griffin Act. These archival data provide not only union officer compensation information, but also ability to pay information.

There have been three studies of correlates of union officer compensation in craft and industrial unions (Bressler, 1972; Ehrenberg & Goldberg, 1977; Sandver, 1978). Results of these studies indicate that, as with top business executives, ability to pay indices (e.g., dues, assets) are significantly related to union officer compensation. These results, however, are limited to local unions and to the top local officer.

The present study of union officer compensation was designed to expand on this previous research in three major respects. First, the focus was on the compensation of national, as opposed to local, union officers. Second, compensation of the top three officers in each union was investigated. This permitted analysis of the top officers' pay structure, as well as possible differences in correlates of compensation among the three officers. Finally, all analyses were conducted for three time periods as a form of replication.

Given the lack of evidence noted above on union officers' pay structures, no explicit hypothesis was made regarding the percentage compensation differentials in existence among the three officers. In keeping with the evidence on stability of pay structures for executives (Patton, 1965), however, it was expected that the union pay structure would be stable across the three time periods, whatever its precise nature.

With regard to correlates of union officers' compensation, six variables were chosen for investigation. Four of these may be considered ability to pay indices—dues, assets, cash disbursements, and liabilities. *It was hypothesized that the first three of these (dues, assets, and cash disbursements) would be positively related to, and the last (liabilities) would be negatively related to, compensation.* The other two variables may be considered measures of job complexity—number of local unions and amount of local union control over collective bargaining. Number of local unions is an indication of how many separate governing bodies the national officers must communicate with and coordinate. Thus *it was hypothesized that number of local unions would be positively related to union officer compensation.* The less the amount of control that the local union has in collective bargaining, the greater the coordination and control of local collective bargaining required by the national officers. Thus, *it was hypothesized that there would be a negative relationship between amount of local control and union officers' compensation.*

METHOD

Sample

The sample was comprised of the 100 largest (based on membership) national unions that were in continuous operation during the period 1962-1973. Data for each union were gathered for three of the years in this period: 1962, 1967, and 1973. A listing of these unions and their membership is available on request from the first author.

Measures

Measures of total compensation, dues, assets, cash disbursements, and liabilities were taken from the LM-2 forms filed annually by all national unions with the U.S. Department of Labor. The LM-2 forms are a complete financial record of the national union. The number of local unions was gathered from the biennial *Directory of National Union and Employee Associations*, published by the Bureau of Labor Statistics. The measure of bargaining control was taken from a taxonomy used by Roomkin (1976). Each measure is described in more detail below.

Total Compensation—For each of the three top union officers, total compensation is the sum of remuneration received for salary, expenses, and allowances as shown on the LM-2 forms. This is not necessarily the total annual compensation received, as additional income may be earned both inside (e.g., pension board trustee) and outside (e.g., public lectures) the union.

Dues—Dues are the total dollar volume of income received from dues during the reporting year. This is by far the largest source of revenue for the national unions in the sample, accounting for almost 90 percent of total receipts.

Total Assets—Total assets are the sum of all financial assets reported on the LM-2 forms. It represents the accumulated wealth of the union.

Total Liabilities—Total liabilities are the sum of all financial liabilities listed on the LM-2 forms. It thus represents the accumulated indebtedness of the union.

Cash Disbursements—The total dollar volume of expenditures by the union, less total compensation for union officers, represents cash disbursements.

Number of Local Unions—The measure of local unions is simply the number of local unions affiliated with the national union in each time period.

Bargaining Control—The constitutions of the national unions were examined to determine the extent of local control over collective bargaining. If local unions were allowed under the constitution to enter into collective agreements without approval from a representative of the national union, this was considered local bargaining control. The bargaining control variable was the same for all time periods.

Analysis

In the first part of the analysis means, standard deviations, and intercorrelations for total compensation were computed for each of the time periods. This was followed by computation of ratios of total compensation among the three officers (i.e., the pay structure) in each of the time periods. Finally, zero-order and multiple correlations between total compensation of each officer and the independent variables were computed.

RESULTS

Total compensation means, standard deviations, and intercorrelations are shown in Table 1 by time period. It is noted that although the average top officer's compensation increased $15,780 over the 11-year time period (about 53 percent in "money" terms), this increase was only 6 percent in constant 1967 or "real" dollars. Furthermore, Table 1 reveals two additionally notable results. One of these is the high standard deviation of compensation values around the mean. For instance, although not shown in Table 1, the data show a maximum of $132,529 and a minimum value of $1,200 for the total compensation of the highest paid officer in 1973. Illustrative total compensation figures for 1977 publicly published also show considerable variability across unions ("Where Tradition and Politics Rule," 1978). Second, the table clearly shows that the compensation levels of the top three officers are highly and significantly intercorrelated. The correlation between the compensation of the top officer and the second officer is the strongest (ranging between .78 and .85), the correlation between the second and third officers is the next strongest (ranging from .69 to .82), and finally the correlation between the first officer's compensation and that of the third officer is the weakest of the three, ranging from .58 to .74. The pattern of these intercorrelations is remarkably similar in each of the time periods.

The results in Table 2 are a further refinement of the relationships among salary levels suggested in Table 1. Table 2 gives the compensation ratios between each of the different officeholders for each time period. The ratio calculations show an extremely strong and stable pay structure emerging for the 100 national unions in the sample. For example, in 1973

TABLE 1
National Union Officers Total Compensation: Means, Standard Deviations, Intercorrelations

	1973			*1967*			*1962*		
	Officer 1	*Officer 2*	*Officer 3*	*Officer 1*	*Officer 2*	*Officer 3*	*Officer 1*	*Officer 2*	*Officer 3*
Officer 1	—	.83*	.74*	—	.78*	.58*	—	.85*	.71*
Officer 2		—	.82*		—	.69*		—	.80*
Officer 3			—			—			—
Mean	45,356	35,453	29,030	33,173	26,503	21,516	29,576	22,897	17,626
SD	24,963	19,193	17,493	17,182	14,156	14,504	15,630	12,724	11,674

*$p < .01$

the second officer received about 79 percent of the compensation of the top officer. The third officer received about 83 percent as much compensation as the second and about 65 percent as much as the highest paid official. The ratios of second to top and third to second became even closer in 1967 and were the same (.79) in 1962. The ratio of the third highest to the top paid increased slightly to .67 in 1967 and fell off slightly to .61 in 1962. The major conclusion to emerge from Table 2 is that there are pay differentials of about 20 percent between adjacent levels that maintain themselves over time.

TABLE 2
Ratios Among National Union Officers Total Compensation

	1973		*1967*		*1962*	
Ratio	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
Officer 2/officer 1	.79	.21	.82	.28	.79	.22
Officer 3/officer 1	.65	.29	.67	.45	.61	.31
Officer 3/officer 2	.83	.30	.80	.35	.79	.32

The results in Table 3 are a summary of the correlational analysis. A close look at the zero-order correlations in Table 3 indicates substantial stability of relationships across the three time periods. The correlations between compensation and the variables listed in Table 3 are almost always of the hypothesized sign, with the exception of the total liabilities variable in 1967 and 1973. Furthermore, the hypothesized relations are highly significant statistically, except for the total liabilities and bargaining structure variables.

The final two columns of Table 3 present, in some respects, the most interesting results of the analysis. Uniting all of the original independent variables in a multiple regression framework reveals that about 28 percent of the variance in the top officer's compensation in 1973 can be explained by the independent variables included in the model. Additionally, Table 3 shows that 33 percent of the variance in the second officer's compensation, and about 46 percent of the variance in the third officer's annual remuneration from the union can be explained by the model. However, the results of this analysis can be improved remarkably for officer 2 by adding total compensation of officer 1 as an independent variable, and for officer 3 by adding total compensation of officers 1 and 2 as independent variables. In the compensation model for officer number 2, for example, the percentage of explained variance increases from 33 percent to 73 percent. Adding the total compensation of both the top and the second officers as additional independent variables in the compensation model for officer 3 increases $\bar{R}^2$ from .46 to .73.

Indeed, it may be persuasively argued that the compensation of the second and third highest officers is influenced by little else than the compensation received by the top officer. The correlations reported in Table 1, for

TABLE 3

Correlates of National Union Officers Total Compensation: Zero-Order Correlations, Multiple Correlations Squared, Means and Standard Deviations[a]

	Independent Variables						$\overline{R}^2$	
	Dues	*Total Liabilities*	*Disbursements*	*Bargaining Control*[b]	*Number of Locals*	*Total Assets*	*Without TC*	*With TC*
1973								
Officer 1	.32**	.05	.53**	-.14	.25**	.33**	.28**	—
Officer 2	.37**	-.05	.54**	-.03	.33**	.42**	.33**	.73**
Officer 3	.39**	.00	.67**	-.06	.33**	.38**	.46**	.73**
1967								
Officer 1	.37**	-.04	.53**	-.21*	.31**	.39**	.30**	—
Officer 2	.41**	.05	.61**	-.06	.36**	.42**	.38**	.66**
Officer 3	.37**	.04	.56**	-.05	.40**	.36**	.31**	.48**
1962								
Officer 1	.45**	-.07	.57**	-.21*	.48**	.36**	.37**	—
Officer 2	.36**	-.05	.57**	-.08	.45**	.44**	.36**	.75
Officer 3	.50**	-.03	.65**	-.14	.56**	.52**	.51**	.62**
1973								
Mean	7,113,420	1,305,871	369,189	.62	476	14,310,579		
SD	15,302,845	5,300,976	377,498	.49	721	34,662,366		
1967								
Mean	4,154,440	1,058,884	267,873	.62	442	9,517,719		
SD	7,657,948	6,132,225	283,381	.49	563	21,735,257		
1962								
Mean	2,581,260	641,379	250,225	.62	468	7,689,409		
SD	5,203,294	4,287,514	259,500	.49	564	18,141,611		

[a] Complete regression results including beta coefficients are available from the first author.

[b] 1 = local control, 0 = other control.

*$p < .05$

**$p < .01$

example, reveal that 69 percent of the variance of the compensation of officer 2 in 1973 is explained by the salary of officer 1; adding the remaining independent variables to the model only explains an additional 4 percent of the variance increasing the $\bar{R}^2$ to .73. The same result is true for the salary model for officer 3 in 1973; 67 percent of the variance in the compensation of officer 3 is explained by the compensation received by officer 2. Adding all of the additional independent variables to the model for officer 3 only increases the $\bar{R}^2$ to .73. The results for the years 1967 and 1962 follow approximately the same pattern as that for 1973. In each year, all of the multiple correlations are highly significant.

DISCUSSION

The results of this study indicate that there is a definite internal pay structure among top national union officers and that the compensation of the top officer plays a major role in determining the compensation received by lower level officers. The relevant compensation ratios exhibited high stability over the three time periods, and such stability closely parallels that found among top business executives by Patton (1965). The slope of the pay structures for union officers, however, is somewhat flatter than that for top business executives.

The results of the correlation analysis here for national union officers are similar to the previously noted results for local union officers (Ehrenberg & Goldberg, 1977; Sandver, 1978). Dues, disbursements, and total assets all exhibited strong relationships with total compensation in all three time periods, and for all three officers. In addition, number of local unions also was consistently and significantly related to total compensation, verifying the job complexity hypothesis discussed in the introduction.

Results for the bargaining control variable, though in the hypothesized direction, were somewhat weak with the exception of the model for the top officer. The coefficient for the bargaining control variable was significant at the .05 level for the top officer in 1961 and 1967 and was significant at the .06 level in 1973. A possible explanation for this result is that although local control over collective bargaining has a significant negative effect on the compensation of the highest union officer, this factor does not affect the compensation of the second and third officers. This result suggests further that responsibility for national level collective bargaining resides solely with the top officer. A more refined scaled measure of bargaining control, as opposed to the simple dichotomy used here, perhaps would have yielded more definitive results.

Finally, it is noted that total assets were consistently predictive of total compensation, but total liabilities were not. This may simply reflect the somewhat high correlation between total assets and the other independent variables, but not so for total liabilities. It also may be due to the definition of total liabilities. They simply are a measure of accumulated indebtedness, which includes a large amount of long term debt (mortgage and loans) that poses no threat to the solvency, liquidity, or other measures of financial stability of the organization.

In general, the results of the correlation analysis show some similarities to results obtained in the studies of business executives. That is, both ability to pay and job complexity variables account for significant portions of the variance in the total compensation of both business executives and union leaders, suggesting that compensation practices for these seemingly dissimilar organizational entities are somewhat alike. It should be noted, however, that in general the correlations obtained in the studies of business executive compensation are somewhat higher than those obtained here (Wallace, 1976).

The findings of this study suggest numerous additional areas of research. The results reported here focus solely on demand side variables (e.g., ability to pay and job complexity) and do not deal at all with supply side variables dealing with the characteristics of the officers themselves (e.g., education, experience, tenure in office). It would be worthwhile to explore the effect of supply side considerations in determining compensation for union as compared to business executives. In addition, no attempt has been made here to account for the effects of historical or institutional forces on the compensation of union officers. Taft (1950), for example, noted that national unions formerly affiliated with the AFL seem to pay their officers higher salaries than do those formerly affiliated with the CIO. More recently ("Where Tradition and Politics Rule," 1978) interest has focused on the forces of prestige and symbolism that some organizations attach to having highly paid leaders. Additional work shedding light on these areas would contribute significantly to the understanding of compensation practices in national unions.

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Research Notes

GOAL CONGRUENCE AND EMPLOYEE ORIENTATIONS: THE SUBSTITUTION EFFECT

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As organizations continue to grow and become more technically sophisticated, the concern over the goal congruence of specialized personnel becomes more important (Osborn, Hunt, & Jauch, in press). Can management presume that professionals and quasiprofessionals will direct their efforts toward those goals most highly prized by management? One aspect of this is the extent to which professionals and quasiprofessionals subscribe to the goal priorities of management.

Three streams of literature suggest that different employee orientations may be associated with goal congruence. One stream comes from early analyses of latent social roles (Gouldner, 1958; Merton, 1957). Initially, it was suggested that professionals could be committed to either organizational or professional goals but not both. Subsequent work has shown that professionals may be committed to neither, either, or both the profession and the organization (Berger & Grimes, 1973). Unfortunately, the association of orientations and goal congruence has taken second billing to the dimensionality of the orientations reported by professionals.

A second line of research has focused on individual and organizational goal compatibility. After initially presuming that individual needs and organizational goals were incompatible, a number of studies, for example, Latham and Yukl (1975), suggest that organizational and individual needs can be reconciled via participation. Now it is presumed that the individual can identify with the organization as an instrument of his or her fulfillment (Rotondi, 1975).

Kidron (1965) summarizes a third view most closely identified with social psychology. Here it is argued that attachment to a system's goals can come via identification with peers. Thus, small groups may aid in inculcating goal congruence of their members through the operation of norms.

Across a broad range of literature, then, two research questions emerge. One, to what extent can orientations toward the profession, the organization, and/or peers be identified? Two, to what extent, if any, are these commitments related to organization goal congruence?

Specific studies on commitment and goal congruence also suggest that a number of issues should be recognized. Harrison and Rosenzweig (1972) suggest that professional norms may be consistent with some goals but not others. Kidron's (1976) analysis suggests that each individual's goal congruence should be studied rather than some aggregate estimate of employee goal congruence. Kochan, Cummings and Huber (1976) note that a number of organizational conditions may be associated with goal compatibility.

Thus, in the present study the two research questions were considered in the light of recent investigations. First, a broad spectrum employee orientations questionnaire was factor analyzed to see what orientations would emerge. Then the associations of the orientations with criteria were investigated over and above a number of controls. Both simple and interactive relationships were examined. In sum, the effort is a guided exploration based on three different perspectives of employee orientations. If successful, a series of such studies can help to integrate different views.

Method

Twenty-one small independent hospitals, which were part of a consortium, agreed to participate in the study. In the small hospitals the administration is the hospital adminstrator. Thus, questionnaires concerning hospital characteristics and perceptions of 14 goals were sent to the 21 administrators. Of the administrator questionnaires, 16 were usable. From the 16 hospitals, 257 professional/technical employees returned usable questionnaires, a response rate of 73 percent. (A complete description of the hospitals' return rates and supporting data for subsequent analyses are available from the senior author.)

An employee orientation questionnaire drew items from several different studies (Berger & Grimes, 1973; Flango & Braumbaugh, 1974; Harrison & Rosenzweig, 1972). See Table 1 for the items.

Both administrators and professional/technical respondents rated 14 goal statements on a 5-point Likert scale ranging from unimportant to very important. Factor analysis of responses on goals suggested that 10 of the goals could be considered either separately or as one estimate. Specifically, Bartlett's test suggested that factor analysis could be applied, and the Scree test showed two possible factors. But no interpretable factor structure was detected. Four goals did not load with the others or themselves and had low communalities (from .37 to .47). Thus, the goals were considered separately (Harrison & Rosenzweig, 1972), and they were summed into a global index (GOLTOT) with an adjusted Spearman-Brown reliability of .85. The absolute difference between the administrator's score and an individual employee's score constituted the measure of goal congruence ($N = 257$).

A number of structural and contextual variables were used as controls (Kochan et al., 1976). Two were based on the perceptions of the administrators. They were *standardization* (Pugh, Hickson, Hinings, & Turner, 1968), consisting of 16 items (Spearman-Brown reliability = .92), and *formalization* (Pugh et al., 1968), having 33 aspects (Spearman-Brown reliability = .85). Because a third measure, *specialization*, did not have sufficient reliability, two nonperceptual measures were calculated for each hospital. They were the number of different occupational specialties and the Gibbs-Martin D (Labovitz & Gibbs, 1964). Finally the $\log_e$ number of employees was included as a control for size.

Factor analysis and multidimensional scaling were used to investigate the dimensionality of the employee orientations. This analysis is straightforward, but there are two sticky issues in examining the association of the orientation with goal congruence. One is the appropriate unit of analysis. Although there are 257 independent goal congruence scores, these are nestled in 16 hospitals that are themselves interrelated. Even with controls there is the possibility of hospital (management) effect contaminating the results. Two, because the aspects of employee orientation were expected to be oblique and interactions among them were to be examined, there was the potential for substantial multicolinearity. These two issues were resolved partially with the use of multiple regression analysis. Following Darlington (1968) and Allison (1977), among others, changes in *R*-square were examined rather than beta weights, and the character of the interactions were described. After this analysis a series of hospital membership vectors was included. While they often added significant proportions of total explained criteria variance, their inclusion did not change the associations among orientations and goal congruence. An ideal solution to these two issues, however, awaits developments beyond the scope of this paper.

Results

Table 1 provides data concerning the dimensionality of the employee orientation scale. Bartlett's test indicated that the scores were factorable, and the Scree test suggested that three factors could be identified. Parametric mapping and multidimensional scaling confirmed the presence of three factors. The factor structure in Table 1 is based on Rao's method with oblique rotation (delta = -.05). Factor 1 was called professional identification (*PI*); factor 2 items were predominantly concerned with organizational loyalty (*OL*); and factor 3 appeared to center on peer loyalty (*PL*). When considered as additive indices, the adjusted Spearman-Brown reliabilities were .83 for *PI*, .83 for *OL*, .65 for *PL*. The correlation between *PI* and *OL* was .15 and .10 for *PI* and *PL*. However, the *OL* and *PL* correlation was .35.

An examination of the items and cross-loadings in Table 1 suggests that there is a clear division between professional identification and the other two dimensions. However, data for the other two dimensions are less clear and not unlike those found in earlier analyses (Berger & Grimes, 1973; Flango & Brumbaugh, 1974).

TABLE 1
Factor Loading Matrix for Three Employee Orientations

	Professional Identification	*Organizational Loyalty*	*Peer Loyalty*
Items[a]	*Factor 1*	*Factor 2*	*Factor 3*
1 Contribute new ideas to the field	.63	.00	-.06
2 Do important and worthwhile things	.73	.05	-.03
3 Build my professional reputation	.46	.11	-.13
4 Have congenial colleagues	.63	.05	-.04
5 Work with good colleagues	.61	-.03	.05
6 Increase knowledge of my field	.84	-.02	.02
7 Make use of present skills	.80	.09	-.05
8 I would go to a better hospital if given the chance	-.07	.63	-.08
9 There are few here to share my professional interests	.03	.64	-.24
10 People here are cool and aloof	.15	.58	-.20
11 I get no intellectual stimulation here	.07	.55	-.26
12 How would you feel about showing facilities to colleagues visiting your hospital?	.00	.60	-.10
13 How would you feel about introducing your fellow staff to colleagues visiting your hospital?	.08	.71	-.18
14 My important sources of recognition are here	-.01	-.01	-.44
15 Colleagues here contribute to my professional growth	.12	.31	-.81
16 Most here are loyal to the hospital	.06	.23	-.69
17 I get good professional advice here	.05	.21	-.67
18 How many staff I know well	.00	.17	-.38

[a] All rated on a 5-point Likert scale. The scoring was done such that a "high" score was positive towards the organization. For example, an affirmative response that the individual "would go to a better hospital" was scored "low." A respondent "proud to introduce fellow staff members to visiting colleagues" was scored "high." The items did *not* all appear in the same location on the questionnaire.

Table 2 presents the results of the multiple linear regression analysis for the 10 goals taken independently and for GOLTOT. It is noted that all three interactions of employee orientations account for significant unique variance for 5 of the 10 goals examined. On these five goals a triple interaction term was tested but not found to be significant for any of the goals. For one goal, none of the double interactions was significant. There were no significant main effects of the orientation variables found on this goal either. Also note that the interaction of peer and organizational loyalties provides significantly unique variance for 9 of the 10 goals examined. Further, all three interactions were found to be significant in predicting total congruence (GOLTOT). It is speculated that no significant difference was found for goal 4 (lower mortality) because of low variance on this particular criterion.

Figure 1 for GOLTOT illustrates the pattern found in 23 of the 25 significant interactions. In Figure 1, the values plotted for peer loyalty with professionalization on the X axis, indicate that high or low professionalization makes little difference in goal congruence when high peer loyalty is present. But if low peer loyalty (dotted line) is present, then professionalization yields higher congruence as it moves from low to high. The same is true for the other two interactions. When one of the employee orientations

TABLE 2
Full Model R^2 and Additional ΔR^2 for Orientation Interactions

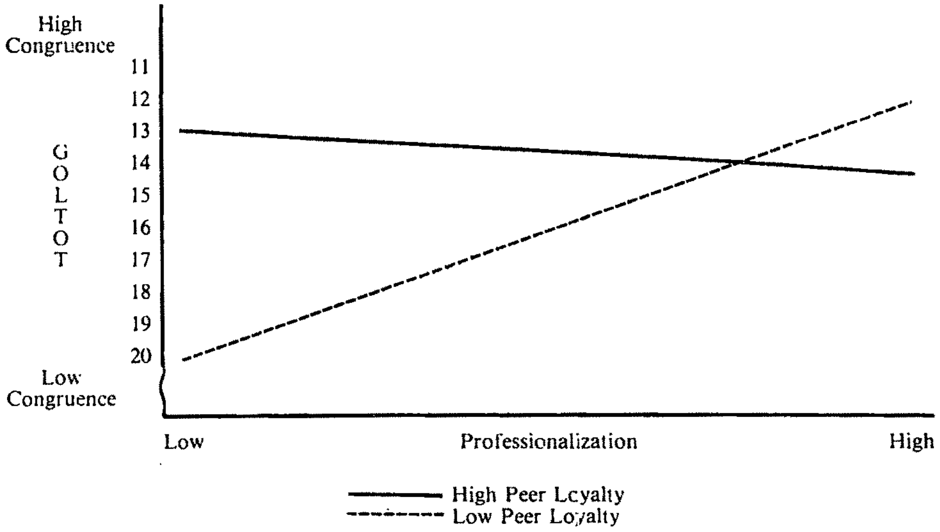
	R^2 and ΔR^2 for Interactions[a]					
	P×OL		P×PL		PL×OL	
Goals of the hospital[b]	R^2	ΔR^2	R^2	ΔR^2	R^2	ΔR^2
1. Provide quality patient care	.27	.02*	.27	.02**	.27	.02**
3. Lessen human pain	.13	.06***	.13	.06***	.17	.10***
8. Survive as an institution	.15	.03**	.15	.03**	.14	.02*
13. Have good employee relations	.24	.02**	.24	.02*	.26	.04***
14. Have a friendly environment	.21	.04***	.19	.02*	.21	.04***
4. Lower mortality	.09	NS	.09	NS	.09	NS
5. Provide public health education	.12	NS	.15	.03**	.15	.03**
6. Provide preventive medicine	.14	NS	.16	.02*	.17	.03***
10. Provide low cost care	.14	.02*	.15	.03**	.12	NS
12. Have a good staff-patient ratio	.16	NS	.16	NS	.19	.03**
GOLTOT	.27	.05***	.27	.05***	.29	.07***

[a] P = professional identification; OL = organization loyalty; PL = peer loyalty; full model R^2 is Goal $x = P + PL + OL$ + Interaction(s) + Controls + Error. Differences in significance levels of ΔR^2 of similar values are due to rounding.

[b] The administrators and professionals were both given the following question: "Below is a list of goals which a hospital might have. Please indicate how important each one is to your hospital." Very unimportant (1) to very important (9). A difference score was the absolute value of the goal as rated by the professional subtracted from the rating of that goal by his/her administrator ($N = 257$). The maximum possible difference range (0-8) was found for each goal. (0 = complete agreement). GOLTOT = sum of goals 1, 3, 4, 5, 6, 8, 10, 12, 13, 14.

*$p < .05$
**$p < .01$
***$p < .001$

FIGURE 1
Plot of Peer Loyalty and Professionalization Interaction with Total Goal Congruence



is high, the strength of the other orientation is almost meaningless for goal congruence. When one is low, the other orientation appears capable of substituting for it in terms of yielding congruence with total goal priorities of the hospital.

Although the data are far from conclusive and may be unique to the techniques and measures employed, the patterns should be noted. One, factor analysis suggests that three oblique employee orientations can be identified. In addition to professional identification, the base of attachment to a system may reflect the identification with the organization as a system, and/or identification with one's peers. Two, the pattern of interactions among professional identification, organizational loyalty, and peer loyalty suggests that identification in any form is associated with goal congruence. Identification with the profession, organization, or peers may substitute for one another when it comes to goal congruence. In general, then, goal congruence among professionals and quasiprofessionals may be quite complex and may not rest on one particular type of orientation alone. Apparently several orientations can substitute for one another.

Although the findings may not generalize to larger organizations or beyond small rural hospitals, the incorporation of the notion of a potential substitution effect might be most useful. For example, when attempting to predict satisfaction, turnover, and the like, perhaps attachments to any number of organizationally related collections may substitute for one another. If an employee is not attached to the ideology of the organization or even fellow workers, this may be comparatively unimportant if the organization provides the opportunity for professional identification. Such a notion is not new, but it may be time to take it seriously. With concentration solely on the individual, group, or organization dominating the literature, it may be time to consider more guided explorations that incorporate multiple levels of analysis.

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ABILITY-SATISFACTION RELATIONSHIPS: FIELD AND LABORATORY STUDIES[1]

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The purpose of the present study is threefold: (1) to investigate the relationship between ability and job satisfaction in settings where such relationships have not been obscured by turnover; (2) to extend earlier laboratory research on the nature of the relationship as a function of the task; and (3) to compare such relationships in laboratory and field settings.

Behling and Schriesheim (1976) have noted that although intelligence has been consistently related to turnover on routine, repetitive jobs, it has not been consistently related to more subjective attitudinal measures. They suggest that the latter relationship is in fact hidden by the high turnover among more intelligent workers. The present study involves laboratory subjects and military personnel, thus minimizing the possible confounding effects of turnover.

Forbes and Barrett have recently shown that abilities were related to satisfaction on two laboratory tasks. Based on a review of job design and activation theory literature, they hypothesized that:

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[1] This research was supported by the Office of Naval Research, Contract NONR N00014-74-A-0202-0001, NR 151-351 (Gerald V. Barrett, Principal Investigator).

> task satisfaction is related to the proportion of an individual's cognitive and perceptual capacity demanded by the task, and that there exists some optimal load that is most satisfying. . . this point occurs when the task demands approach the individual's full capacity (1978, p. 189).

In their study, a negative relationship between ability and satisfaction was found on a very simple task (the task demanded the full capacity of only the least capable subjects) and an inverted-U shaped relationship was found on a moderately complex task (moderate ability subjects were most satisfied). It was suggested that positive relationships between ability and satisfaction might occur on a more complex task with demands that more closely matched the cognitive and perceptual capacities of high ability subjects.

The present study included an attempt to create the more complex task referred to by Forbes and Barrett (1978). However, the present research also involved the simultaneous manipulation of job responsibility along with task complexity. This was done in an attempt to examine the effects of job "enrichment," not merely job complexity. Very little attention has been paid to the effects of individual differences in ability on job redesign efforts. Dunham (1977) has demonstrated that perceived job characteristics are positively related to estimated ability requirements. The present research proposes that as job characteristics and ability requirements increase, the nature of the relationship between ability and satisfaction will change.

Specifically, *it was hypothesized that: (1) the less demanding task would challenge only those with little ability and therefore negative relationships between ability and satisfaction would occur; and (2) the more demanding task would be of appropriate difficulty only for the more able subjects and therefore positive ability-satisfaction relationships would occur.*

It recently has been noted that both laboratory and field research in industrial/organizational psychology have been too narrow in their choice of subjects, settings and behaviors. Therefore, coordinated laboratory and field studies are recommended (Dipboye & Flanagan, 1979). The present study includes both a laboratory experiment and a field survey of the job that is simulated in the laboratory.

Method

Subjects—The subjects in the field investigation were 29 naval enlisted male sonar and radar operators. The subjects in the laboratory experiment were 60 undergraduate students (34 males and 26 females) from the University of Akron who volunteered to participate in an experiment in exchange for $2 per hour. They were divided equally into two groups, but because of equipment malfunction, data were obtained from only 29 subjects in each condition.

Laboratory Apparatus and Stimulus Presentation—The subjects monitored screens on which slides containing 60 geometric symbols were rear-projected. All symbols were approximately 1 cm in diameter when projected onto the screen. Slides were presented for an average of 5 seconds. A symbol requiring a response occurred approximately every 30 seconds. Two to four subjects were run simultaneously. Each subject was seated before a screen in one of four specially constructed booths that isolated the subjects from each other.

Laboratory Task Manipulations—Two laboratory tasks were designed. One was low in both complexity and responsibility. The other was high on both dimensions. In the low complexity condition, subjects were required to detect the presence and possible inward movement of only one signal. In the high level of complexity, the subjects were required to monitor three different types of signals with three different types of movements.

Different levels of responsibility or individual accountability were created by changing the instructions given the subjects. A low level of accountability was created by informing each group of subjects that they were all monitoring the same area; that it was only necessary for any one subject to detect a signal; and that only group performance measures would be recorded, thus precluding individual feedback. A high level of accountability was created by informing subjects that they were solely responsible for their own individual areas; that the system would operate properly only if all signals were detected; that all their responses would be recorded and that they would be given individual feedback at the end of the session.

Procedure—The laboratory subjects were given a test battery that included the Wesman personnel classification test (Wesman, 1965), a measure of general intelligence, and two measures of perceptual ability: the group embedded figures test (Witkin, Oltman, Raskin, & Karp, 1971) and the rod-and-frame test (Witkin, Lewis, Hertzman, Machover, Meissner, & Wapner, 1954).

The experimental session consisted of three one-hour vigils in which slides were monitored for relevant signals as defined in the instructions. When the three-hour task was completed, the subjects described the task on the attribute description scale (Barrett, Bass, O'Connor, Alexander, Forbes, & Cascio, 1975) and the work itself scale of the job descriptive index (Smith, Kendall, & Hulin, 1969).

In the field survey, the naval personnel were administered the work itself scale from the job descriptive index and a questionnaire designed to determine how long they intended to remain in the Navy. Naval test battery ability measure scores were obtained from each participant's personnel file.

Results

Table 1 presents the ability to satisfaction and ability to intended future naval service associations from the field investigation. Of the 14 correlations, 13 are negative (i.e., high abilities associated with both lower satisfaction and shorter intended future naval service) and several of the

TABLE 1
Correlations of Abilities with Work Satisfaction and Intended Future Navy Service[a]

Ability Measures (Naval Test Battery)	*Sample Size*	*Satisfaction (Work Itself)*	*Intended Future Naval Service*
Verbal aptitude	29	-.43*	-.43*
Arithmetic and reasoning	29	-.33	-.11
Mechanical understanding	28	-.07	.11
Clerical skills	28	-.52**	-.43*
Sonar scale	17	-.35	-.40
Radar scale	16	-.44*	-.41
Electronic technician selection test	24	-.44*	-.25

[a] Sample sizes vary because scores on all scales were not available for all subjects.
*$p<.05$
**$p<.01$

associations are both moderately strong and significant. As expected, satisfaction with the work itself and intended future naval service were positively correlated ($r=.49$, $p<.01$) within these data.

Results from the laboratory investigation support the success of the task manipulations with the more demanding task being perceived as involving greater complexity ($t=2.07$, $p<.05$) and responsibility ($t=2.21$, $p<.05$). In addition, subjects working on the more demanding task made more errors ($t=7.63$, $p<.001$) than did their counterparts working on the simple task. Average satisfaction levels for both jobs were low, and the difference across conditions was nonsignificant (simple task, $x=17.31$, demanding task, $x=16.03$). Futhermore, performance and satisfaction were not significantly associated for either of the laboratory tasks.

Ability to performance and ability to satisfaction correlations for the laboratory investigation are presented in Table 2. The consistent significant associations between high abilities and high performance indicate that the ability measures employed were highly relevant to performance on both of the laboratory tasks. Ability to satisfaction associations, however, were less consistent. For the simple task, for which high abilities were predicted to be associated with low satisfaction, only one of the observed correlations was significant and in the predicted direction. On the demanding task, however, for which higher abilities were hypothesized to be associated with higher satisfaction, two of the three observed correlations were significant, but both were in the direction opposite to that predicted. No curvilinear associations were found between abilities and satisfaction within the current data.

Discussion

The role of ability in determining job satisfaction has been largely ignored. In the present study, negative relationships between abilities and satisfaction were found in both a field setting (naval personnel) and in a laboratory simulation of the field task. That is, the more capable

TABLE 2
Correlations of Abilities with Performance and Work Satisfaction by Laboratory Task Condition[a]

Ability Measures	*Performance (Total Errors)*	*Satisfaction (Work Itself)*
Wesman personnel classification test		
Simple task	-.68***	-.07
Demanding task	-.47**	-.41*
Group embedded figures test		
Simple task	-.69***	-.41*
Demanding task	-.49**	-.59***
Rod and frame test		
Simple task	.39*	-.16
Demanding task	.46*	.16

[a] The rod-and-frame test is scored in terms of deviations from vertical; therefore, a low score indicates greater ability; $n = 29$ for both conditions.

*$p < .05$

**$p < .01$

***$p < .001$

individuals were less satisfied with their jobs. The more capable naval personnel also indicated the intention to leave the service sooner than less capable subjects.

Although similar relationships were found in both the field and the laboratory, the differences between the settings should be noted. The following are some possible confounding factors: academic versus military setting, temporary versus full-time employment, differences in the task itself (i.e., low fidelity simulation), differences in the degree to which the task was learned, and, of course, differences among the subjects themselves. Therefore, the negative relationships may have occurred for different reasons in different settings. In fact, this appears to be the case when the effects of the task manipulations are examined.

On the less demanding task, the expected negative relationship between ability and satisfaction was found with only one ability measure—the group embedded figures test. It is noted that this is the same ability that was negatively related to satisfaction in the Forbes and Barrett (1978) study, in which a similar but even less demanding monitoring task was used. The more demanding task was perceived as involving greater complexity and responsibility than the simpler task. However, the mean level of satisfaction in this condition was no higher than that on the simple task. In addition, the increased difficulty of the demanding task resulted in much lower levels of performance; and, instead of the expected positive correlations between ability and satisfaction, strong negative correlations were found.

A possible explanation for these findings involves the very high level of difficulty of the demanding task (the mean error rate was 39 percent for this task). Although the more able subjects did perform better, it may be that their performance expectations were much higher than those of their less able counterparts and, therefore, they may have experienced greater frustration in their efforts to perform well on this very difficult task. This frustration may have caused their greater feelings of dissatisfaction with the task.

Current job design efforts are intended to overcome the motivational problems inherent in overly simplified jobs. The present data indicate that on such jobs the most dissatisfied workers are those with the greatest ability. However, the present results also indicate that attempts to "enrich" jobs may result in ability requirements being raised too high, in which case similar problems result (i.e., generally low levels of satisfaction, with the most able workers being the least satisfied). The present data, combined with those of Forbes and Barrett (1978), suggest that ability is an important moderator of the response to a task and that satisfaction is likely to be maximized when individual abilities match the requirements of the task.

Much more research is needed to clarify the nature of the relationships between abilities and job satisfaction. However, because it has been shown that the process of job enrichment is likely to result in an increase in the job ability requirements (Dunham, 1977), job designers should begin to consider explicitly the relationship between the ability requirements of the new jobs and the ability levels of the current worker population.

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RELATIONSHIPS BETWEEN EMPLOYEES' ATTITUDES AND ERROR RATES IN PUBLIC WELFARE PROGRAMS[1]

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Since the review of the literature on organizational performance by Campbell, Bownas, Peterson, and Dunnette (1974) several studies have investigated the relationships between external organizational constructs (e.g., uncertainty-instability, competition, degree of regulation, complexity) and *objective* measures of organizational performance (Pennings, 1975; Simonetti & Boseman, 1975; Hirsch, 1975; Kimberly & Nielsen, 1975). Other studies have examined the relationships between internal organizational factors (e.g., flexitime schedules, organizational climate) and objective measures of organizational performance (Golembiewski & Proehl, 1978; Pennings, 1976; Petty & Bruning, 1978).

In the last study the researchers found that employees' attitudes accounted for 45 percent of the variance in direct administrative costs across 51 county level, public welfare organizations in one state. These results led the researchers to conclude that public welfare funds may be administered more efficiently if employees are satisfied with their jobs.

The purpose of the present investigation was to explore the relationships between an objective measure of organizational *effectiveness* (error rate) and employees' attitudes concerning job satisfaction and role stress in labor intensive public welfare agencies. Specifically, the following research hypotheses were tested:

Hypothesis 1. Employees' satisfaction will be inversely related to error rates in public welfare programs.

Hypothesis 2. Employees' role stress will be positively related to error rates in public welfare programs.

Method

Procedure—The present study was part of a larger study that was designed to evaluate the effectiveness of employee training in one state-supervised county-administered financial assistance and social service agency. During January 1977 a questionnaire and a letter from the commissioner of the agency explaining the nature of the study and requesting the voluntary completion of the questionnaire were distributed to employees in the state office through the internal mailing system. Employees in the district and county offices received their questionnaires and the commissioner's letter from their district or county director. All directors were given sufficient copies of the questionnaire for their employees at meetings held in each of the six district offices. Time was taken by the researchers during these meetings to explain the nature of the study and to provide assurances regarding the confidentiality of responses. Each employee was asked to return the completed questionnaire by mailing it directly to the researchers in postage paid envelopes. Approximately eight weeks were provided to complete the questionnaire.

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[1] This research was supported by HEW-SRS Grant #18-P-90452/4-01. Nealia S. Bruning was a doctoral student in Organizational Behavior and research assistant at the Management Institute, University of Alabama, at the time this study was conducted.

Subjects—Questionnaires were distributed to 4,260 agency employees, of which 2,625 completed the questionnaires. This figure represented a return rate of 62 percent. The respondent sample was predominantly female (82 percent), young (53 percent were less than 31 years old), and highly educated (55 percent had at least a four year college degree). The personnel division of the agency reported that these figures were representative of the total agency population. Estimates also were made of the participation rates within each job category. These figures were all over 50 percent and were fairly evenly spread across all job classifications.

The respondents were employed in four major programmatic areas: Aid to Families with Dependent Children (AFDC), Medicaid, Food Stamps, and Social Services. Only the first three programs were included in the present study because error rate information was not available for the social service programs.

Measures—Job satisfaction. Job satisfaction was measured by the job descriptive index (JDI) developed by Smith, Kendall, and Hulin (1969). The measures of satisfaction with work, pay, promotion, supervision, coworkers, and total satisfaction were included in the present study.

Role stress. Role conflict and role ambiguity scales each contained six items. Of the 12 items, 8 were developed by Rizzo, House, and Lirtzman (1970). The other four items were developed specifically for the present study. The internal reliabilities (coefficient alphas) of the scales were .78 for role conflict and .75 for role ambiguity.

Error rates. The agency's programs were administered by 46 county offices with the assistance of six district offices. Error rates were based on the agency's quality control division's review of a random sample of cases within each district office. County level error rate information was not available.

The AFDC error rate was based on a review of 2,418 cases during the calendar year 1976. Types of error included ineligible cases, overpayment, and underpayment. The medicaid error rate was based on a review of 475 cases during the period April 1, 1976, through March 31, 1977. An error was defined to be a case that was ruled ineligible for medicaid. The food stamp error rate was based on a review of 2,382 cases during the calendar year 1976. Types of errors included ineligible cases, overpayment, underpayment, overissuance of stamps, and underissuance of stamps.

For purposes of the present study each of the six districts was categorized into one of two groups, low error rate group or high error rate group. In the AFDC program districts F and E (error rates = 18 percent and 19 percent) formed the low error rate group, and districts A, B, C, and D (error rates = 31 percent, 28 percent, 27 percent, and 26 percent) formed the high error rate group. In the medicaid program, districts A, C, and F (error rates = 8 percent, 15 percent, and 15 percent) formed the low error rate group, and districts D, B, and E (error rates = 17 percent, 19 percent, and 30 percent) formed the high error rate group. In the food stamp program, districts C, E, and B (error rates = 37 percent, 44 percent, and 45 percent) formed the low error rate group, and districts D, F, and A (error rates = 47 percent, 52 percent, and 53 percent) formed the high error rate group.

Results

The research hypotheses were tested with a series of one-way analyses of covariance with error rate as the independent variable (two levels: low error rate group and high error rate group), employees' perceptions of job satisfaction and role stress as dependent variables, and employees' education and length of service with the agency as covariates. The covariates were included in the design because they have been found to be correlated with job attitudes in previous studies (Gibson & Klein, 1970; Altimus & Tersine, 1973; Quinn & Staines, 1978) and in the present study. In addition, chi square analyses indicated that length of service with the agency varied significantly ($p < .05$) across districts in all three programs, and education varied significantly across districts in two of the three programs. Subsequently, the means that appear in the following tables have been adjusted (Kirk, 1968) for those covariates to prevent demographic characteristics from confounding the results.

Data pertaining to Hypothesis 1 are found in Table 1. Some support for Hypothesis 1 was found in the AFDC program, in which the low error rate group reported significantly higher levels of satisfaction with work, promotion, co-workers, and total satisfaction. No support for Hypothesis 1 was found in the medicaid program, and only one of the six mean comparisons in the food stamp program was significant ($p < .05$) and in the direction specified by Hypothesis 1. Although none of the rank order correlations in any of the programs was statistically significant ($p < .05$), five of the six correlations in both the AFDC and food stamp programs were in the direction specified by Hypothesis 1. The small sample size ($N = 6$) made it difficult for the rank order correlations to reach the .05 level of significance.

TABLE 1

A Comparison of the Adjusted[a] Mean Levels of Job Satisfaction Between the Low and High Error Rate Groups and the Spearman Rank Order Correlation Between Error Rate and Adjusted Mean Levels of Job Satisfaction for All Six Districts by Program[b]

	Satisfaction with:					
Program	*Work*	*Pay*	*Promotion*	*Supervision*	*Coworkers*	*Total Satisfaction*
AFDC						
Mean for the low error rate group ($n=193$)	27.89	10.76	13.36	40.41	38.87	131.29
	*	NS	**	NS	*	**
Mean for the high error rate group ($n=335$)	25.84	10.26	10.51	40.11	36.07	122.79
Rank order correlation	-.37	.09	-.43	-.20	-.77	-.60
Medicaid						
Mean for the low error rate group ($n=120$)	28.04	12.15	11.35	39.97	37.03	128.54
	NS	NS	NS	NS	NS	NS
Mean for the high error rate group ($n=164$)	27.40	11.35	13.69	41.15	37.17	130.76
Rank order correlation	-.53	-.33	.39	.81	.24	-.16
Food stamp						
Mean for the low error rate group ($n=310$)	27.27	12.33	13.82	40.01	37.63	131.06
	NS	NS	**	NS	NS	NS
Mean for the high error rate group ($n=310$)	28.93	11.77	9.98	39.45	37.01	127.14
Rank order correlation	.67	-.14	-.77	-.26	-.26	-.26

[a]Adjusted for employee's level of education and length of service with the agency.

[b]The critical value of the Spearman rank order correlation coefficient at the .05 level of significance for $N=6$ is .83.

NS. Mean difference between low and high error rate groups was not significant.

*$p<.05$

**$p<.01$

Data pertaining to Hypothesis 2 are found in Table 2. Only one of the six mean differences was significantly different and in the direction predicted by Hypothesis 2. In this one case the low error rate group in the AFDC Program reported a level of role conflict that was significantly lower than the role conflict of the high error rate group. None of the rank order correlations was significant.

Discussion

The results of the present study lend some support to the supposition that the effective administration of the AFDC program is partially dependent on having satisfied employees. Petty and Bruning (1978) have also

TABLE 2

A Comparison of the Adjusted[a] Mean Levels of Role Stress Between the Low and High Error Rate Groups and the Spearman Rank Order Correlations Between Error Rate and Adjusted Mean Levels of Job Stress for All Six Districts by Program[b]

Program	*Role Conflict*	*Role Ambiguity*
AFDC		
Mean for the low error rate group ($n = 193$)	16.67	14.73
	*	NS
Mean for the high error rate group ($n = 335$)	17.74	14.79
Rank order correlations	.66	−.09
Medicaid		
Mean for the low error rate group ($n = 120$)	18.03	14.84
	NS	NS
Mean for the high error rate group ($n = 164$)	18.12	14.77
Rank order correlation	−.21	−.04
Food stamp		
Mean for the low error rate group ($n = 310$)	16.64	14.44
	NS	NS
Mean for the high error rate group ($n = 310$)	16.28	14.48
Rank order correlations	−.56	.26

[a] Adjusted for employees' level of education and length of service with the agency.

[b] The critical value of the Spearman rank order correlation coefficient at the .05 level of significance for $N = 6$ is .83.

NS. Mean difference between low and high error rate groups was not significant.

*$p < .05$

found that the efficient administration of other public welfare programs appears to be partially dependent on having satisfied employees. The findings of the two studies are not surprising when one considers that public welfare agencies are labor intensive.

It should be noted, however, that the present study suffered from the limited availability of error rate measures. These could be obtained on a district level basis only ($N = 6$), but the programs were administered on a county level basis ($N = 46$). County level data thus would have been more appropriate. Another limitation of the present study was that the attitudinal data were collected after the time period in which the error rate data were generated. Thus, conclusions concerning the direction of any cause-effect relationships between attitudes and error rates should not be drawn from the present study.

It is hoped that the present study will generate interest among researchers to conduct additional studies that will utilize methodologies addressing the nature of the relationships between employees' attitudes and objective measures of organizational performance. When one considers that an estimated $160 billion was spent in fiscal year 1977 by federal, state, and local government agencies for assistance to the poor (Bacon, 1979), it is not difficult to see the need for additional research that attempts to identify organizational strategies for improving the efficiency and effectiveness of public welfare programs.

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THE IMPACT OF GOAL SETTING ON SURVEY RETURNS[1]

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Nevin and Ford (1976) investigated the effects of assigning 5-day, 7-day and 9-day deadlines on the return of questionnaires completed anonymously and found that deadlines not only failed to stimulate a greater,

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[1] The authors wish to acknowledge the helpful comments of T. R. Mitchell in preparing this article.

more immediate response than did a no-deadline condition, but that the use of a deadline actually seemed to decrease the total return rate after the deadline has passed.

Nevin and Ford's study was atheoretical and based on empirically derived assumptions about ways to increase survey return rates. More importantly, the study used college students as subjects, which raises questions as to the external validity (Campbell & Stanley, 1966) of their findings. In contrast, the present study was conducted within a theoretical framework that can be used to explain the impact of organizational deadlines on employee behavior in an industrial setting.

Locke's (1968) theory of goal setting states that an individual's behavior is determined primarily by his goals or intentions. Two specific hypotheses derived from goal setting theory are (1) specific goals lead to higher levels of performance than do general goals such as "do your best," and (2) specific hard goals lead to higher performance levels than do easy goals. The internal and external validity of research supporting these two hypotheses has been reviewed by Locke (1968) and by Latham and Yukl (1975).

A third hypothesis derived from goal setting theory states that time limits affect productivity to the extent that they influence an individual's goals. This hypothesis has been supported by laboratory research (Bryan & Locke, 1967) which showed that subjects who were given a limited amount of time to complete a task did so more quickly than did subjects who were given twice as much time to complete the task. Latham and Locke (1975) replicated these results in a field study; they found that a decrease in the number of days that logging crews could sell timber to paper companies resulted in an increase in the productivity of these workers.

As Nevin and Ford (1976) pointed out, a critical problem in survey research is ensuring that the questionnaire will be returned promptly. One purpose of this study was to test the generalizability of Locke's theory of goal setting to survey research. Specifically, it was hypothesized that the speed with which questionnaires are returned is higher for a specific hard goal than for a specific goal of moderate difficulty, and that both goal setting conditions lead to greater speed of returns than a general "as soon as possible" condition.

With regard to the role of an authority figure in survey returns, researchers who conduct surveys seldom have as much organizational authority as does a respondent's immediate supervisor; a slow response or no response to a researcher may be perceived as carrying little or no penalty. For this reason the present study also investigated survey returns to a researcher versus an immediate supervisor. The authors found no studies that directly tested the role of an authority figure on survey returns.

A third purpose of this study was to investigate the role of anonymity in conjunction with an authority figure on survey returns. The literature with regard to anonymity on survey returns is not clear. Butler (1973) found no differences in response favorability between sensitive and nonsensitive items when anonymity was manipulated, but he did not investigate either speed or rate of returns. Fuller (1974) found that naval officers who gave their identity had both a higher response rate and more favorable attitudes toward the Navy than did officers who remained anonymous. However, the same study revealed no significant differences on any dependent measure among naval enlisted personnel. No studies were found that tested anonymity and organizational authority simultaneously.

Method

Sample—The sample consisted of 401 male employees between the ages of 22 and 65 years in an international company in the northwestern United States. The educational level of these people ranged from a high school diploma to a doctoral degree.

Procedure—The employees were randomly assigned to one of the three conditions. The conditions were distinguishable by the last sentence in the survey instructions, namely: (a) "Please return your questionnaire by ______" (two working days after receiving the questionnaire), (b) "...by ______" (five working days after receiving the questionnaire), or (c) "...as soon as possible." No one was told that the last sentence in the instructions differed, and no one reported any awareness of this difference.

Degree of anonymity and authority was manipulated by attaching a cover letter to the survey that was either (a) signed by the researcher asking the respondent not to sign his name, (b) signed by the researcher asking the respondent to please sign his name, or (c) signed by the respondent's immediate supervisor asking the respondent to please sign his name. Thus, the cover letter signed by the researcher (a company employee) asked the respondents to return the survey to the researcher, and the letter signed by the immediate supervisor asked that the questionnaire be returned to him. It should be noted that the last condition (c) explicitly confounded anonymity with surveys returned to the supervisor.

Organizational constraints prevented the random assignment of equal proportions of respondents to the three anonymity/authority conditions. Supervisors were selected to participate in the experiment based on their availability and their representativeness of supervisory positions in the company. These supervisors included both line and staff personnel and were physically removed from their subordinates approximately the same distance as were the researchers. The total number of employees in the three respective anonymity/authority conditions was 242, 131, and 28. These individuals were randomly assigned to the three goal conditions in equal proportions.

The questionnaires were hand carried by company personnel to each respondent's office. In this way, it was possible to control for variance due solely to the fact that the respondents were away on vacation or business. All questionnaires were returned to either the researcher or the respondent's immediate supervisor via the company's internal mail system.

The questionnaire dealt solely with evaluations and attitudes toward programs conducted by the company. No questions were asked about a supervisor or any other individual. The questionnaires varied from two to three pages in length depending on the specific program (e.g., suitability of a bonus program). Although no differences in return rate based on questionnaire length were expected (Berdie, 1975; Sheth & Roscoe, 1975), surveys of different lengths were distributed equally among experimental conditions in this study.

Results

Table 1 shows the speed (mean number of days) with which the questionnaires were returned. This table is based only on the questionnaires that were actually returned. A 3 × 3 unweighted means analysis of variance revealed a significant main effect for goal setting only; $F(2, 307) = 4.88$, $p < .01$. Planned t-tests indicated that the mean number of days to return a survey was significantly less in the 2-day ($M = 3.82$, $SD = 2.63$) than in the "as soon as possible" ($M = 4.78$, $SD = 3.85$) condition, $t(207) = 2.10$, $p < .05$. The 5-day ($M = 4.15$, $SD = 2.37$) condition was not significantly different from either the 2-day or the "as soon as possible" condition.

TABLE 1

Speed of Survey Returns[a]

	Anonymity/Authority Condition			
Goal Condition	*Unsigned Returned to Researcher*	*Signed Returned to Researcher*	*Signed Returned to Supervisor*	*Total*
Two days				
Mean	3.95	4.00	7.00	3.82
SD	2.44	2.93	2.29	2.63
N	58	34	10	102
Five days				
Mean	4.15	3.83	5.44	4.15
SD	2.10	2.57	2.79	2.37
N	62	36	9	107
As soon as possible				
Mean	5.05	3.56	7.00	4.78
SD	3.52	2.73	7.33	3.85
N	67	32	8	107
Total				
Mean	4.41	3.33	4.82	4.26
SD	2.83	2.75	4.90	3.10
N	187	102	27	316

[a] Mean number of days.

A significant interaction between goal conditions and anonymity/authority groups, $F(4, 307) = 3.46$, $p < .01$, appears to be due to a greater effort to comply with instructions (goals) when they came from a supervisor rather than from a researcher. Although Scheffê contrasts revealed no significant differences between the mean number of days in any goal condition for surveys returned to the researcher, the difference between the 2-day and the "as soon as possible" conditions for surveys returned to the supervisor was significant, $F(8, 307) = 2.67$, $p < .01$.

The number of questionnaires returned by company mail in each condition was recorded each succeeding workday. Questionnaire returns were recorded for 18 workdays, after which no more questionnaires were received. This is comparable to results obtained by Berdie (1973), Nevin and Ford (1976), Stanton (1939), and Veiga (1974). Table 2 shows the percentage returned by condition.

TABLE 2
Percentage of Surveys Returned

	Anonymity/Authority Condition		
Goal Condition	*Unsigned Returned to Researcher*	*Signed Returned to Researcher*	*Signed Returned to Supervisor*
Two days	72.6	79.1	100.0
Five days	76.5	83.7	100.0
As soon as possible	83.8	71.7	88.9

These data were analyzed by partitioning the 2 (returned versus not returned) × 9 (conditions) contingency table into a series of single degree of freedom orthogonal comparisons (Castellan, 1965). The results indicated that there were no significant differences among the goal-setting conditions with regard to survey return rates. However, the percentage of surveys returned to the supervisor was significantly greater than the percentage returned to the researcher regardless of whether the surveys were signed ($X^2 = 4.76$, $p < .03$) or not ($X^2 = 5.51$, $p < .02$). Thus, the results indicate that anonymity of the respondent does not appear to be a relevant factor in return rate.

With regard to the effects of goal setting and anonymity/authority on survey responses, F-tests revealed no significant differences on responses to the items. Thus, for the types of questions involved in the present survey (program evaluation), neither time limits nor anonymity/authority appears to have any systematic effect on the favorability of questionnaire responses.

Discussion

The results of this study extend the generalizability of goal setting theory regarding time limits. Setting specific hard goals affects the speed with which internal company surveys are returned. A hard goal can lead to surveys being returned faster than a general "as soon as possible" goal. That the 2-day time limit constituted a hard goal was evident from the number of written comments from the respondents regarding the difficulty in meeting this deadline. Nevertheless, a 2-day limit often is necessary for internal company surveys for which responses to a given issue are needed in an exceedingly short time period. That the moderately difficult goal condition was not significantly better than the general goal condition may have been due to the variability expressed by the respondents in the "as soon as possible" condition in interpreting the request. To some people "as soon as possible" meant to return the questionnaire immediately. For others it meant to return the questionnaire "when you get the chance."

The results of this study also indicated that goal setting per se does not appear to affect the percentage of surveys returned. As Nevin and Ford (1976) concluded, goal setting may, in fact, have a detrimental effect. Once a due date (goal) has passed, the respondents may feel that it is too late to return the questionnaire. That is, completing the questionnaire may be perceived as a waste of time and effort because it might not be included in the data analysis. Unless there is pressure to return the questionnaire after the deadline has passed, some respondents may simply abandon the task.

The respondents in the "as soon as possible" condition did not appear to experience an imposed deadline when the questionnaire was to be returned to a researcher. They apparently completed the questionnaire in what they considered to be a reasonable time period (an upper range of approximately 3-3.5 workweeks). However, as Ronan, Latham, and Kinne (1973) have suggested, supervisory presence (instrumentality) appears to be a key to goal acceptance. Requiring that a survey be signed and returned directly to the supervisor not only increased the percentage of surveys returned but, when combined with goal setting, increased the speed with which they were returned as well. Moreover, the content or quality of the responses was not biased by these procedures.

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THE INFLUENCE OF PERSONAL FACTORS AND PERCEIVED WORK EXPERIENCES ON EMPLOYEE TURNOVER AND ABSENTEEISM[1]

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A review of the literature on employee turnover and absenteeism indicates fairly clearly that most studies on the topic utilize bivariate rather than multivariate analyses and examine only one form of withdrawal behavior (Mobley, Griffeth, Hand, & Meglino, 1979; Muchinsky, 1977). As a result, little is known about the *relative* influence of major sets of antecedents on turnover and absenteeism. It is the intent of this study to examine the relative influence of two major sets of antecedents on both forms of withdrawal behavior. These two sets are personal factors and the work experiences of employees. In the literature, considerable emphasis tends to be placed on identifying work-related influences (including work experiences) on withdrawal processes with little consideration of whether such influences do, in fact, represent a *major* influence on turnover and absenteeism (Mowday, Porter, & Stone, 1978). Hence, it is useful to compare the predictive powers of such variables with the influence of personal characteristics of the employees themselves.

The selection of these two sets of variables is partly in response to an hypothesis suggested by Nicholson, Brown, and Chadwick-Jones (1976) that work experiences do not have a substantial influence on withdrawal behavior. Based on their study, Nicholson et al. commented that "the common view of absence as a pain reductive response on the part of the worker to his work experience is naive, narrow and empirically unsupportable" (1976, p. 735). At present, there is little information available

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regarding which set of influences, personal factors or work experiences, is relatively more important. It seems logical, therefore, to explore this issue further by examining both sets of antecedents simultaneously.

Personal characteristics examined in this paper include: age, tenure in the organization, tenure in position, sex, and education. These variables were selected for study because of their purported importance in employee withdrawal behavior (Nicholson, Brown, & Chadwick-Jones, 1977; Nicholson & Goodge, 1976). Five work experience perceptions were examined in the present study (Buchanan, 1974). These are: (1) group attitudes toward the organization, i.e., the extent to which one's peers had positive or negative attitudes toward their employer; (2) met expectations, i.e., the extent to which one's expectations concerning organizational life have been met on the job; (3) job challenge, i.e., the ability of the organization to provide challenging and stimulating work assignments, (4) personal importance to the organization, i.e., personal feelings that the employee is making real contributions to the organization; and (5) organizational dependability, i.e., a stable flow of expected inducements from the organization to employees. All of these work experiences represent perceptions of having undergone a particular class of experience in the work environment. See Buchanan (1974) for a detailed discussion.

The work experiences chosen for analysis represent the most important indicators of organizational commitment in Buchanan's (1974) study. Because current evidence indicates that organizational commitment is predictive of withdrawal from the organization (Steers, 1977), each of the above work experiences was a good candidate for inclusion into this analysis of withdrawal behavior. Relationships between these work experiences, as measured by Buchanan's instrument, and turnover and absenteeism have not been previously examined.

Method

Sample and Research Site—This study was carried out among a sample of 200 clerical and service workers of a major midwestern hospital. Average age of the subjects was about 37, and average tenure was about seven years. Educational backgrounds were primarily high school degrees.

Research Instruments—Personal characteristics. Subjects supplied information on questionnaires concerning their tenure in the organization, tenure in position, sex, age, and educational attainment.

Work experiences. The five work experience variables that characterize the job situation were measured using the instrument developed by Buchanan (1974). Each scale (described above) is represented by several items measured on 7-point Likert scales. Internal consistencies of the five scales ranged from .64 to .80, using coefficient alpha.

Turnover and absenteeism. Turnover data were collected for one year after questionnaire administration. During this period 17 percent of the sample turned over. Absenteeism was measured as the number of days absent from work over a 9-month period.

Data Collection—Questionnaires were administered on-site by university researchers during regular working hours. Subjects were informed that participation was voluntary and were assured confidentiality of responses. Of the initial random sample, questionnaire data were collected from 87 percent. Thus, the resulting sample size on which the analyses were based was 200. Absenteeism data were available for only 124 subjects in the sample.

Results

Initially, concern focused on examining the extent to which various sets of variables were interrelated. Pearson product-moment correlations among study variables revealed a median $r = .12$ among the various personal factors, a median $r = .57$ among the various work experiences, and a median $r = .16$ between personal factors and work experiences. Due to the high intercorrelation among the work experiences, partial correlations were used for purposes of analysis, as described below. Finally, turnover and absenteeism were found to be unrelated ($r = .06$).

Multivariate Analysis—First, correlating sets of both personal characteristics and work experiences with withdrawal behavior yielded multiple Rs $= .33$ and $.42$, respectively, for turnover and absenteeism, indicating that these factors when taken together do indeed significantly influence withdrawal behavior. These results compare favorably with earlier findings (Garrison & Muchinsky, 1977) even though the magnitude is not particularly strong, suggesting the existence of other factors (e.g., reward systems) that also influence withdrawal. Results are shown in Table 1.

TABLE 1
Simple and Partial Correlations Between Personal Characteristics and Work Experiences and Turnover and Absenteeism

	Turnover		*Absenteeism*	
	Simple r	*Partial r*	*Simple r*	*Partial r*
Personal characteristics				
Tenure in organization	−.10	−.08	.16**	.34**
Tenure in position	−.06	.03	−.12	−.23**
Sex	−.14*	−.12*	.13	−.18*
Age	−.06	.02	−.17*	−.23**
Education	.13	.11	.07	−.01
R_{PC}	.20		.35*	
Work experiences				
Group attitudes	−.18**	−.04	−.16*	−.03
Met expectations	−.18**	.01	−.15*	.04
Job challenge	−.18**	−.07	−.23**	−.15*
Personal importance	−.14*	.03	−.23**	−.13
Organizational dependability	−.23**	−.12*	−.16*	.01
R_{WE}	.29*		.30	
R_{PC+WE}	.33		.42*	

*$p < .05$
**$p < .01$

Second, when multiple correlations were run separately for personal characteristics and work experiences and subsequent turnover and absenteeism, it was found that antecedents of absenteeism were different from those for turnover. Personal characteristics were significantly associated with absenteeism ($R = .35$, $p < .05$), but not turnover ($R = .20$, N.S.). On the other hand, work experiences were significantly associated with turnover ($R = .29$, $p < .05$) but not absenteeism ($R = .30$, N.S.). The magnitude of prediction for work experiences and both forms of withdrawal, however, was the same. Williams' tests (Williams, 1959) show that one particular equation was not significantly more predictive than another prediction equation for each dependent variable.

The contribution of each set of influences to explained variance above and beyond that of the other set was obtained by decomposing the multivariate relationships provided in Table 1, using the procedure of Cohen and Cohen (1975); the addition of work experiences to personal characteristics results in an increase of only .07 (not significant). With regard to the prediction of absenteeism, R is increased by .12 with the addition of personal characteristics to work experiences (a significant increase, $p < .05$). With regard to the prediction of turnover, R is increased by .13 with the addition of work experiences to personal characteristics; the addition of personal characteristics to work experiences results in an increase of only .04. Neither increase is statistically significant.

Bivariate Analysis—In order to provide further information regarding the factors that most closely relate to turnover and absenteeism and to replicate the simple bivariate analyses one typically finds in the literature for comparative purposes, bivariate correlations were computed for each personal characteristic and work experience separately with each measure of withdrawal behavior. Results are shown in Table 1.

Simple Pearson product-moment correlations for each of the sets of measures show little consistent relationship between personal characteristics and turnover and absenteeism. On the other hand, there is a consistent relationship between each of the work experiences and both forms of withdrawal. In order to correct for common methods variance, fourth order partial correlation coefficients were computed for work experiences partialling out the effects of all other work experiences. These same procedures were used for personal characteristics. Results in Table 1 show that the number of significant work experience predictors decreased dramatically and the number of significant personal characteristic predictors increased, especially for absenteeism.

After partial correlation, only one personal characteristic, that of sex, was significantly related to both turnover and absenteeism. Males had higher turnover rates than females. In addition, both forms of tenure and age were all related to absenteeism, but not turnover. Such findings are consistent with Nicholson et al. (1977). No other personal characteristics were related to turnover.

With regard to the relationships of individual work experiences with turnover and absenteeism, only the partial correlation between experienced organizational dependability and turnover was significant, and only the partial correlation between experienced job challenge and absenteeism was significant. These findings would be expected from theory (Buchanan, 1974; Steers & Rhodes, 1978).

Discussion

The focus of this study has been exploratory in nature. The relationship between two major sets of determinants of withdrawal behavior, personal characteristics and work related experiences, have been examined as they relate to turnover and absenteeism. Several conclusions should be noted. First, it was found that turnover and absenteeism were relatively independent. This supports Porter and Steers' (1973) contention that turnover and absenteeism are distinct behaviors in need of separate attention.

Second, it was determined that absenteeism was better predicted by personal factors than by work experiences, but no clear trend emerged for turnover in terms of relative predictive power. Thus, for this particular sample of hospital employees, turnover behavior is distinguished from absenteeism in terms of the antecedents of each behavior, especially with respect to personal characteristic antecedents. With respect to work experiences, perceived organizational dependability was significantly related to turnover but not absenteeism. Conversely, job challenge was significantly related to absenteeism but not turnover.

Of particular note is the inverse relationships between age and absenteeism and tenure and absenteeism. Such a pattern would not normally be expected. This leads to agreement with the recent conclusion of Muchinsky (1977) that there is a great amount of inconsistency in this research. Muchinsky postulates that the reason for such disparate results in the absenteeism literature is probably due to the myriad of different ways absenteeism is measured. However, when one closely examines the review of the literature by Rhodes and Steers (1978), which includes information on the types of absenteeism measures used, one finds that results are still inconsistent *within* different measures of absenteeism. Perhaps inconsistent results not only are due to the type of absenteeism measure used but they also are a function of the type of sample used and/or level of aggregation used. Or, perhaps inconsistent relationships are found because underlying causal variables of absenteeism have not yet been identified. These same notions may apply to the study of turnover as well.

Overall, the results of this study support the contention of Nicholson et al. (1977) and Nicholson and Goodge (1976) that personal characteristics are more superior predictors of absence behavior than are work experiences. They also support Nicholson et al.'s (1976) contention that absence behavior is probably not a pain reductive response on the part of the worker to work experience. The results of the study suggest further that turnover may be the more likely candidate for being the pain reductive response on the part of the worker to his or her work experience, although this is speculative based on available data.

In summary, personal characteristics exhibited a higher correlation with absenteeism than turnover, and work experiences had correlations of similar magnitude with absenteeism and turnover. These results point to the importance of using multivariate and comparative analyses in the study of withdrawal behavior. In particular, the results using partial correlations caution against the proliferation of simple bivariate correlations. Moreover, the differential results for turnover and absenteeism emphasize the need for more comparative studies. Further efforts in these directions should add measurably to the existing level of knowledge of withdrawal processes in organizations and will contribute useful information to managers interested in controlling both types of behavior.

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The 1980 Annual Meeting of the American Institute for Decision Sciences will be held November 5-7 at the Las Vegas Hilton Hotel. AIDS Twelfth Annual Meeting program promises to be a significant step toward improved teaching and research in theory and applications of the Decision Sciences. The emphasis of the program is on providing a balance among subdisciplines and on creating opportunities for interdisciplinary dialogue.

The Breakfast/Plenary Session will be held on the first day of the meeting from 7:45 to 9:15 a.m., Wednesday, November 5. The feature speaker is Mr. Wilson W. Sick, Jr. (MSIA, Carnegie-Mellon), Group Vice President-Finance and Administration, American Motors Corporation.

The program includes workshops, panel sessions, research paper sessions, topic tables, panels, symposia, and tutorials. Several of these sessions are designed to treat prominent issues in decision processes that transcend traditional disciplinary boundaries.

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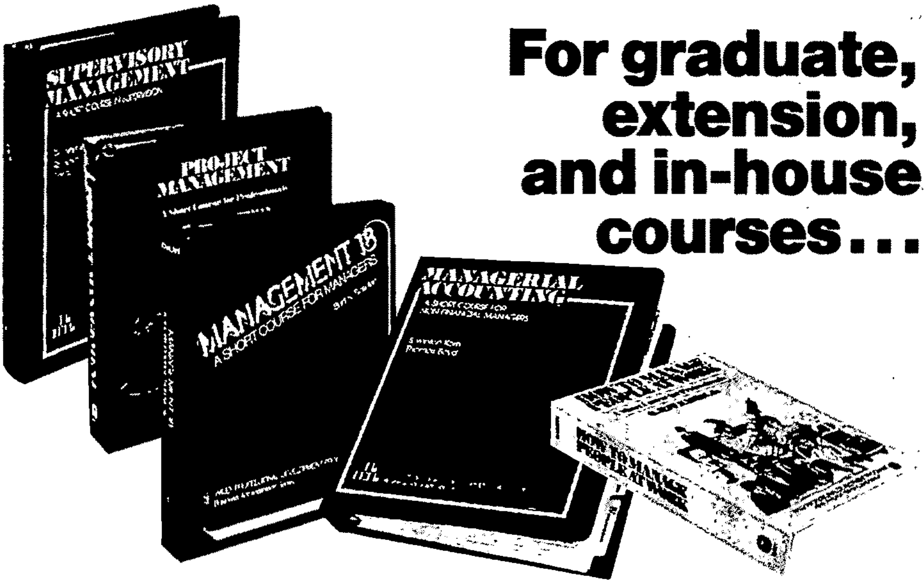
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Editorial Comment

AMJ is interested in publishing empirically based research manuscripts that address salient theoretical problems confronting the field of management. Surveys that do not address theoretical problems should not be forwarded to *AMJ*. We welcome research methodologies that serve to coalesce points of view on a particular research problem. I have told members of the Editorial Review Board that statistical analyses should not strangle good theory building and testing.

Research Notes are appropriate for reporting the validation of studies, negative findings and new data on existing instruments. The brevity of a Note indicates that the data are of interest to *AMJ* readers although the theoretical paradigm explicated might be tentative or inconclusive.

A summary of *Journal's* operations for the period of September 21, 1979, to September 23, 1980, is presented below. This report represents an up-date of similar reports that appeared in past December issues of *AMJ*.

1. Total new manuscripts submitted	361
2. Manuscripts accepted after all revisions	63
3. Manuscripts rejected	176
4. Manuscripts under revision	72
5. Manuscripts under editorial review	50
6. Average review time for original submission	40
7. Average review for revisions	25
8. Current accepting manuscripts for March, 1982	
9. Current backlog of accepted manuscripts	60

J.W. S.
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Momentum and Revolution in Organizational Adaptation[1]

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École des Hautes Études Commerciales, Montreal
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McGill University

The change in 24 structural and strategy making variables over time is analyzed by a study of 26 companies. Organizations were found to resist reversals in the direction of change in strategy and structure. Two extremes were demonstrated: periods of momentum in which little or no trend is reversed and dramatic periods of revolution in which a very great many trends are reversed.

The one theme that stands out in the literature is that organizations tend to demonstrate great sluggishness in adapting to their environments. Organizations often resist change even when their environments threaten them with extinction (Hedberg, 1973, 1974, 1975; Maniha & Perrow, 1965; Hedberg, Nystrom, & Starbuck, 1976). This may be due to the pursuit of stability and avoidance of uncertainty (Carter, 1971), the programming of activities and the reluctance to deviate from programs (March & Simon, 1958), the inability to innovate (McGuire, 1963), the incapacity of firms to appraise accurately their own performance (Wildavsky, 1972), executives' narrow and parochial models of external reality (Hedberg et al., 1976), and the economies of stability (Perrow, 1972). Any findings on the adaptive process would be expected to reflect the problems caused by natural resistance to change.

The literature seems to emphasize this resistance almost exclusively and to point out the advantages, in certain environments, of organizations that are loosely structured, organic, and oriented toward product-market innovation, open communications, expert-based power, etc. (Burns & Stalker, 1961; Thompson, 1967; Galbraith, 1973; Lawrence & Lorsch, 1967). More timely and presumably effective responses are expected to take place given such orientations.

Yet there seems to be a bias in this point of view. Histories by Filgas (1967), Wilson (1954, 1968), Hower (1943, 1949), Moore (1945) and others

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[1] The authors are grateful to the Canada Council for Grants #S76-0378 and 410-77-0019 and to the Government of Quebec for FCAC Grant #EQ1162.

seemed to show, for example, that although it was true that increasingly "mechanistic" (Burns & Stalker, 1961) firms tended to become still more mechanistic over time, it also was true that firms moving in an "organic" direction would become still more organic later. Initial increases in centralization would lead to still more centralization; but the same was true for the movement toward decentralization. A sort of momentum seemed to prevail which applied also to the rate of product market innovation, the adequacy of organizational intelligence, the level of technocratization, the style of decision making, and many other features of strategy and structure. In other words, any emerging organizational tendency, whatever its direction, will tend to have momentum associated with it. The momentum could be functional or dysfunctional and appeared to be a central feature of organizational adaptation. Therefore, it was thought to be better to study *reversals* in the *direction* of change than to study resistance to change. Most organizations are always changing. But they appear to be biased in their direction of evolution so that they generally extrapolate past trends. These thoughts gave rise to a tentative model of organizational adaptation which this paper begins to test.

A MODEL OF ORGANIZATIONAL ADAPTATION

The model has three related tenets that are based on previous theoretical and empirical works in the literature on organizations.

1. Momentum is expected to be a dominant factor in organizational evolution; that is, reversals in the direction of change in variables of strategy and structure are expected to be relatively rare. The literature points to a very large number of potential causes of momentum. Clark (1972) and Mitroff and Kilmann (1976) have shown that enduring organizational myths and ideologies are crucial factors in the direction of an organization's evolution. Watson (1969), Argyris and Schon (1977), Wilensky (1967), and Wildavsky (1972) have shown that these orientations often entail rather narrow, self-affirming models of reality that reinforce past behavior and cause it to be amplified in the future. Miller and Mintzberg (1974), Watson (1969), and Hedberg et al. (1976) have pointed to the primacy of heuristics that have enjoyed past success and their consequent tendency to be extrapolated past their point of usefulness. Political coalitions in organizations often have vested interests in evolving strategies (Pettigrew, 1973, 1974). Reversals in the direction of evolution often are resisted because they entail an admission of past failure and therefore tend to erode the power base and self-esteem of certain individuals. Finally, an elaborate set of programs, goals, and expectancies grows up around an organization's modus operandi (March & Simon, 1958; Cyert & March, 1963; Thompson, 1967). These represent the outcome of a rather complex bargaining and reconciliation process and reflect the evolutionary wishes of key members of the organizational coalition. Thus continuity in the direction of evolution is more likely to be in line with the operative goals,

power structures, programs, and expectations and will be readily assimilated; for reversals the opposite will be true (Hedberg, 1973, 1974, 1975; Lindblom, 1968).

2. Momentum is likely to coexist among a great many variables of strategy and structure at the same time; that is, momentum will be pervasive. Most of the organizational studies during the last several decades have tended to show that there are integral relationships among environmental, organizational, and strategy-making variables. Changes (or stability) in the variables will tend to occur together, or will follow one another after a very brief interval, in order to maintain an appropriate balance or "configuration." So momentum in one variable, will lead to momentum in others. Findings by Burns and Stalker (1961), Woodward (1965), Lawrence and Lorsch (1967), Thompson (1967), Khandwalla (1972, 1973) and Mintzberg (1979) show how closely interdependent are the features of the environment and those of the organization. For example, as external uncertainty continues to increase, so will differentiation, integration, delegation, decentralization, technocratization, scanning, communication and so on. Close links among features of strategy and structure also have been established in studies by Chandler (1962), Channon (1973), Rumelt (1974), Paine and Anderson (1977), Mintzberg (1973), and Miles and Snow (1978). Miller (1980a) has argued that such multivariate interdependencies tend to manifest gestalts, that is common configurations of mutually reinforcing elements of strategy, structure and environment. Miller (1980b) provides evidence for these gestalts and claims that they represent integrated, self-perpetuating alignments among a complex of variables. For example, a common gestalt is the Weberian bureaucracy with its stable environment, specialized and formalized procedures, functional basis of organization, elaborate administrative structure, and high volume, low variety product-market strategy. Another gestalt might be the "organic" firm with its loose definition of tasks, high level of technocratization and delegation, expertise-based power, high technology, innovative strategy, dynamic environment, and so on. The parts represent mutually reinforcing elements of the whole. (Descriptions of potential gestalts can be found in Mintzberg, 1973, 1979; Miles and Snow, 1978; and Miller and Friesen, 1978, 1980.) Thus, in order to achieve the intricate reconciliation or balance among variables that is needed to maintain the gestalt, many variables will exhibit momentum during the same time interval. As, say, dynamism continues to increase, so will many variables of strategy and structure.

3. Organizational adaptation is also likely to be characterized by periods of dramatic revolution in which there are reversals in the direction of change across a significantly large number of variables of strategy and structure. There are two reasons underlying this assertion. The first relies on the gestalt rationale conveyed in the last paragraph. When a major decision or event occurs (e.g., a new strategy, a new leader, or a dramatically altered market), it may destroy a previous gestalt and result in a period of

"unlearning yesterday" and "inventing tomorrow" (Hedberg et al., 1976). As the organization tries to realign itself to the new realities, reversals in the direction of evolution occur among *many* variables (Starbuck, Greve, & Hedberg, 1978; Miller & Mintzberg, 1974; Normann, 1971; Starbuck & Dutton, 1973). This effects a major new reconciliation among attributes of strategy, structure and environment. The second reason for expecting revolutions is that in some cases pervasive momentum has resulted in many excesses or problems, all of which must be reversed to redress the balance between an organization's orientations and the demands of its environment (Miller, 1980b).

The goal of the present research was to operationalize and test this model of organizational adaptation.

METHOD

Variables Measured

Whether one is studying biological or organizational adaptation, three categories of variables are germane: the environment of the organism, its physiology or structure, and its behavioral repertoire or strategy making. The choice of variables within each category must at this stage remain tentative, given the exploratory nature of the study. Two selection criteria were used: (1) the relevance of variables in previous studies of adaptation and (2) their susceptibility to measurement in the data base used. In their studies of the adaptive process Chandler (1962) and Channon (1973) show the interplay among variables such as differentiation, centralization, delegation, and controls. Carter (1971) elicited the role of variables such as proactiveness, risk taking, analysis, multiplexity, futurity, and dynamism. Burns and Stalker (1961) recalled innovation, communications, technocratization, and integration. Many other works were suggestive (Miller, 1976; Miller & Friesen, 1977, 1980). (The definitions of the 24 variables and the scales used in the research are available from the senior author.) A lengthy rationale for the selection of variables is given by Miller (1976).The environmental variables that were measured were: *dynamism, hostility*, and *heterogeneity* of the markets. Structural or organizational variables included: *scanning, controls* and *communication system effectiveness, centralization of authority for strategy making, delegation of routine authority, technocratization, resource availability, differentiation, tenure* (years in office) *of top management* and the prevalence of *traditions*. Strategy making was described by: *proactiveness, risk taking, product-market innovation, analysis, multiplexity, integration, futurity, consciousness of strategies, adaptiveness*, and *industry expertise*. Performance was also measured.

Data Bases and Scoring Procedures

Two distinct data bases were used in the research. The unusual nature of the first necessitated the use of the second. Because it was decided to focus on organizational adaptation as it takes place over time and because a broad sample of firms was needed to allow generalizations, it was necessary to perform longitudinal research on *numerous* firms. The only manageable way to do this was to employ detailed published organizational histories in the form of books or lengthy *series* of cases that covered at least 20 years of continuous history. Because of the problems of interpreting, scoring, and analyzing the data from such a sample, it was necessary to employ questionnaires that solicited information from executives who played key roles in the corporate histories to test the validity and reliability of the findings. The sample contained 26 firms. An average of five periods of history were studied in each firm.

Published Data—The published data base was the most unusual. (A listing of this data base is available on request.) In order for studies to be admitted and retained in the sample, they had to contain sufficient information for raters to be able to score 90 percent of the scales of the 24 variables. Historical accounts were chosen rather than textbook cases that illustrate organizational dysfunction. The scoring proceeded in two steps: (1) the identification of periods of analysis or "transitions" as they are called and (2) the scoring of the 24 variables at the beginning and end of these periods. Both steps were performed by two independent raters, each of whom was well acquainted with case analysis, had read many organizational histories, and had doctoral level training in management policy and organizational theory.

The choice of a heuristic for defining a period of analysis always must involve a degree of arbitrariness. The principal guide was the researcher's intuitions about what might be interesting about the adaptive process. Organizational adaptation is complex and can be studied from many perspectives. The goal here was to study the more intricate, challenging, nonroutine type of adaptation; the type that has a consequential impact on the way the variables of structure, strategy making, and environment interact over time. Tiny, single variable changes were not the major focus. Instead, it was the manner in which these changes interrelate to compose more complex, holistic, and revealing scenarios of adaptation. The desire was to identify such common "packages" of change and to discover some details about their nature and genesis. These are called *transitions* because they are intended to portray change that can be of an important and complex nature. A transition is measured by the changes in the scores on the 24 variables over the period of analysis.

The problem of how to select the right period of analysis is not easily solved, however. If the period is very brief, only small and simple changes would be likely to surface, and these were not the topic. In contrast, if the period were very long (and defined by changes along the 24 variables computed by comparing scores at the beginning and end of the period), reversals in the direction of change in many variables would be obscured and this would conceal much (when during a period a variable first increases and then decreases, or vice versa, so that a two point comparison of scores obscures offsetting changes). It, of course, is hazardous to standardize the length of a period. The speed of change differs from one firm/period to another so that either of the above difficulties might occur after different intervals.

To rescue the situation, a compromise was effected. A *conditional* scoring heuristic was employed by two independent raters. Raters were told to begin/end a period during a tranquil interval just before any of the following eight critical decisions or events: (1) the replacement of a top executive (president or CEO); (2) the introduction of a new product-market strategy that might involve entering a new market, geographical expansion, new product introduction, etc.; (3) the decision to build a major new facility or to adopt a significantly different production technology; (4) a major change in distribution, promotion, or pricing strategies and techniques; (5) modification of organizational structure and the distribution of authority; (6) a change in the external environment caused by competitor strategies, technological obsolescence, economic booms or recessions, etc.; (7) acquisitions, mergers, or the addition of new departments; and (8) a change in administrative practices pertaining to control and information systems and planning methods. The focus was on major changes—that is, those that would result in a change of at least a point along any of the variables. Periods were normally continued for at least four years to allow significantly complex adaptive scenarios to emerge. If this did not result in a change of at least one point along at least four variables, periods were extended until such a change occurred. Termination would occur, however, before the end of four years if a change that happened during the period was reversed (e.g., where increased centralization is about to decrease in the same period). This was done to avoid obscuring such a change because rating was performed only at period boundaries. A period was never terminated in a year when two or more variables were changing unless offsetting changes were about to occur. That is, periods were begun and terminated when things were relatively tranquil. No gaps were left between periods; that is, the beginning of one constituted the termination of another.

For 86 percent of the cases, the boundaries were agreed upon by the raters. When there was disagreement, the shorter period was used to avoid obscuring offsetting changes. On average, periods were about 6 years in duration, the shortest being 18 months and the longest, 20 years.

Because periods derived using this rule do vary in duration, the research cannot draw conclusions or make meaningful distinctions about *rates* of change. This shortcoming was inevitable, given the objectives of the research and the constraints that motivated the conditional scoring heuristic.

The second step in scoring the published accounts involved assigning ordinal scores along the 24 variables at the beginning of each period. The independent raters (who were never in communication with one another) were given no special instructions except to pay strict attention to the variable definitions and to assign scores from 1 to 7 to indicate whether the firm, relative to others in the rater's experience, was higher (5 to 7), lower (1 to 3) or average (4) along a variable. Before scoring began raters were given 20 diverse histories to get a suitable basis for comparison to be used in assigning scores. A random half of the periods were rated by both raters independently. Interrater reliability was excellent. The average Spearman *r* between raters was .86 for a sample of 50 periods spanning 26 organizations. Only in 3 percent of the cases did scores differ by more than 2 points on the 7-point scales. Missing data represented only about 4.8 percent of the possible scores. After all scoring had been completed, scales of the two raters were averaged if there was disagreement. The total sample consisted of 102 transition periods described along 24 variables.

It is important to establish the validity of the data. Even if scoring reliability is high, the published accounts might contain systematic distortions or might be inaccurate. It was necessary to employ another data base to check these possibilities.

Validity Test Questionnaires—Of the 26 firms in the published sample, 12 still had top executives (presidents, chief executive officers, chairmen, or chief operating officers) who were with the firm, at the vice-presidential level or higher, during the entire final transition period recorded in the data. A questionnaire was devised to measure each of the variables scored in the published sample. (The questionnaire and the coding sheet used to convert the scales into the variable scores are available from the authors.) The relevant executive in each firm was asked to complete the questionnaire, which gauged the *changes* that took place during the final transition period of the firm (exact dates were provided for the executives). Note that changes were measured directly in the questionnaire sample rather than through the conversion of static scores, as was the case with the published data. In all, 10 (83 percent) companies responded. The correspondence in the scores between executives and raters was very good. The correlation coefficient could not be used as an index of reliability because it would be insufficiently demanding—that is, a very *high* correlation would still be possible if raters and executives disagreed on the *direction* of change for many variables ("zigging and zagging" in unison on the change score is all that is required). Given that the focus of the research is on the *direction* of change, this type of discrepancy would be very serious, and so a closer examination of rating correspondence was necessary.

There are several different types of scoring discrepancies to consider. The first and least serious involves scores being in the same direction of change, but differing in magnitude. For example, a change score of 5, indicating an increase in the attribute measured by a variable, may be accorded by the top executive, and a score of 6 might be given by the raters. Because executives do not have in their experience a large sample of organizations for comparing the magnitude of change, it is unreasonable to insist on identical scores. For the type of conclusions that will be drawn, it was sufficient for changes to be in the same direction and within one rating point. For example, one scorer reporting 1 and the other 2 is counted as a "match." So are score combinations such as 2, 3; 5, 6; and 6, 7. In 67 percent of the cases ($N = 177$), this agreement existed between executives and raters.

A more serious disagreement occurs when one scorer reports a *small* increase or decrease (5 or 3), and the other reports no change (4). This form of disagreement occurred in 19 percent of the cases. This percentage is not too daunting. The difference between a small change and no change is often quite subtle and there was no consistent bias for either type of rater. Harmful discrepancies that would distort findings are of two varieties, and they indicate real conflict regarding *significant* changes in the variables. The first occurs when one account reports no change (4) and another shows extreme increases (6 or 7) or decreases (1 or 2) in a variable. This occurred 13 percent of the time. The last and most severe discrepancy happened when accounts report changes in opposite directions (e.g., 3 vs. 5; 2 vs. 6). Fortunately, this occurred in only 2 percent of the cases. It is most encouraging that 85 percent of the time the rater and executive scores were within one rating point on the 7-point scale. This represents a highly exacting degree of similarity.

The second validity test involved sending firms lists of inferential quotations taken from the corporate histories and having executives comment on their accuracy and the representativeness and completeness of the case material in general. In all, 10 companies responded, and 95 percent of the 60 inferential statements (6 per firm for the most recent period) met with complete agreement. The three remaining quotations were subject to qualification on the basis of a minor technicality. Almost 60 percent of the inferential statements were of a critical nature, pointing out a shortcoming of the firm. The executives responded unanimously in favor of the general accuracy, completeness, and unbiased nature of the published accounts.

Earlier there was mention of several hypotheses about the tendency for change in structural and strategy making variables to be continued or reversed over time. The concept of a continuous change and a reversal in the direction of change can have meaning only for two temporally adjacent periods, for which reversals and continuity in the *direction* of change can be gauged.

The basic data are scores of 24 variables at the beginning of each of several consecutive transition periods for each of a number of firms. These raw data are not used further, except to define a series of derived scores for each variable for each period. The latter are called transition scores, and are defined as the difference between the score for any variable at the end of the transition period and its score at the beginning of the period. To make published data commensurate with the questionnaire data, these differences were normalized on a 7-point scale using the following formula: $V_i = ((v_{i2} - v_{i1})/2) + 4$ for a transition period, where v_{i2} is the score for variable i at the end of the period and v_{i1} is its score at the beginning of the period. V_i was defined as a missing value if either v_{i2} or v_{i1} had a missing value.

A variable will be said to change *continuously* over two consecutive transition periods if its transition score is either greater than or equal to four for both periods, or else less than or equal to four for both periods. Otherwise the variable will be said to have had a *reversal* (e.g., from an increase to a decrease or vice versa) from the former period to the latter. The focus of the data analysis will be on whether nonenvironmental variables changed continuously or had reversals over consecutive pairs of transition periods.

HYPOTHESES

The data are analyzed to test three hypotheses.

H.1. Reversals in the direction of change in a variable from one transition period to its temporally adjacent period are expected to be much rarer than continuous changes, that is, changes that are not opposite in direction.

H.2. Because of the interdependencies among variables of organization and strategy making, continuous changes in some variables will cause continuous changes in others. Thus, there will be significantly many simultaneous continuous changes, or simultaneous continuity, among the variables. Simultaneous change means that variables change in the same direction during the period of analysis. They do not, of course, change at exactly the same time.

H.3. For the same reasons, there will be significantly many simultaneous reversals among the variables. For example, a firm that was becoming more decentralized and reverses itself in the next period to move toward centralization, will tend to exhibit reversals in the evolution of many other structural and strategy making characteristics.

Essentially then, the hypotheses outline a model of organizational adaptation that predicts that organizations will have a significant tendency to keep evolving in the same direction and that this will be pervasive across a significantly large number of variables of strategy and structure. This dominant mode of evolution is expected to be interrupted by dramatic periods of reversal in many elements of strategy and structure.

FINDINGS

Each hypothesis was tested and the results are interpreted using the details contained in the published historical accounts.

H.1. Tendency Toward Momentum

The first hypothesis is very easy to test. If momentum is a basic adaptive tendency, one would expect to find a preponderance of continuous links across temporally adjacent periods. A computer program was written to count the number of times each nonenvironmental variable changed continuously and the number of times it had reversals. A test of proportions was used for each variable to see if the proportion of its reversals was significantly smaller than the proportion of its continuous changes. This was found to be true for each variable, with a significance level better than .001, so the first hypothesis was not rejected. The number of pairs of consecutive periods counted for each variable was between 54 and 89, inclusive. A pair of periods was not counted for a variable if one of its scores was missing. On average, continuous changes happened 75 percent of the time and reversals 25 percent of the time, out of a total count of 1,764 changes for all nonenvironmental variables. Therefore, momentum is the dominant tendency for all variables given the preponderance of continuous links.

Some theorists might be tempted to conclude that resistance to reversals in the direction of evolution is bad. Starbuck, Greve, and Hedberg (1978) and Miller and Mintzberg (1974) have highlighted the dangers of organizational momentum. It tends to lead to excesses in structural and decision making variables: decentralization results in atomistic fragmentation, centralization may lead to autocracy, innovation can develop into the gratuitous squandering of resources in the pursuit of superfluous novelty, and initial attempts at formalization and routinization can yield a programmed, unresponsive bureaucracy. Yet, one remains reluctant to criticize organizations that wait for important, unmistakable problems to arise before they are persuaded to move against the momentum. Continuing to change in a consistent direction or to stick with a given orientation is easiest and probably, in the short run, is very economical. It entails the fewest interpersonal conflicts, role uncertainties, and costly changes in structural orientations. This is true whether the firm has been designed to pursue a simple, programmed, and stable course, as was Ford during the 1930s, or whether it has been designed to pursue a dynamic and innovative product-market strategy, as was DuPont of the 1950s. Although from a certain perspective one firm is "changeful" and the other "stable," or perhaps in Burns and Stalker's (1961) terms one is "mechanistic" and the other "organic," a major change of orientation may be equally distasteful to both. The programming of an organic firm may be just as painful, costly, and necessary as the loosening of a mechanistic one. In both cases the modus operandi changes, and confusion, dissatisfaction, conflict, and inefficiency may result. In contrast, for the mechanistic firm to add another standard operating procedure or for the organic firm to give a little more authority to one of the boundary spanning units is very much in accord with the prevalent organizational ethos and will not cause nearly as much confusion or dissatisfaction. Thus, it is difficult so far to form any negative normative bias toward the existence of momentum. An interesting parallel is to be found in the philosophy of science literature. Kuhn, in discussing resistance to paradigm shifts in the face of anomalous results, claims that:

> So long as the tools a paradigm supplies continue to prove capable of solving the problems *it defines*, science moves fastest and penetrates most deeply. The reason is clear. As in manufacture so in science—retooling is an extravagance to be reserved for the occasion that demands it (1970, p. 76).

The balance of the paper tries to show that a significantly large number of organizations tend towards *momentum* in all or almost all variables at once. Then, to correct the very many excesses that were caused, or to create a brand new gestalt among the elements of strategy and structure, they must change across the board via a major *revolution*. It was desired to test this perception quantitatively to see whether there was a significant tendency in transition sequences for many variables to be subject simultaneously to momentum or reversals. The next two sections focus on the simultaneous existence of momentum and reversals, respectively, its statistical significance, and its hypothesized causes. Inferences on the causes of the pervasiveness are based on an informal interpretation of the historical accounts and do not derive directly from the quantitative findings.

H.2. Simultaneous Continuity Among Many Variables

It is hypothesized that there will be a significantly greater than chance proportion of transition sequences that demonstrate continuity of change for all nonenvironmental variables simultaneously. (Simultaneous continuity is not an artifact of the period definition heuristic which merely ensured that multiple changes occurred, irrespective of their direction.) Close associations among strategy and structural variables have been demonstrated by researchers such as Chandler (1962), Burns and Stalker (1961), Thompson (1967), Miles and Snow (1978), Mintzberg (1973), and Miller and Friesen (1978, 1980). It was therefore predicted that many variables will evolve together in consistent directions and that momentum will be exhibited across-the-board. The null hypothesis used was that each variable changed continuously 75 percent of the time, as suggested in the test of the first hypothesis, and that it did so independently of the other variables. To reject this hypothesis is to state that the transition scores of different variables tend to exhibit continuity *together* during a given interval. Under the null hypothesis, the probability that a number r of the 21 nonenvironmental variables change continuously is given by a binomial distribution with parameters $p=.75$ and $n=21$. If $r=21$, the probability is $(.75)^{21}=.005$. The computer program counted 46 pairs of consecutive transition periods for which there were no missing values. (If data were missing on any one variable, the pair of transitions had to be deleted from consideration for hypothesis testing.) It found 4 pairs for which the 21 variables all changed continuously. Now, the probability that the computer program counted u such pairs where all 21 variables changed continuously also follows a binomial distribution which, according to the null hypothesis, has parameters $P=.005$ and $N=46$. From a binomial table it can be seen that the probability that u is 4 or larger is less than .0001, so the null hypothesis is rejected. Thus the number of pairs of transition periods with variables changing continuously is surprisingly large.

Two elaborations of this test were conducted to establish the robustness of this finding. The 21 variables were tested to see if the number of times the proportion of continuous variables was greater than or equal to (≥) 18/21, 19/21, and 20/21 was also greater than what could be expected by chance. In every case, the results were significant (see Table 1, section I). To increase the sample of observations, the variables that had the highest percentage of missing values were deleted. This allowed a larger number of periods to be counted as complete. When variable number 6 (internal communications) was deleted, the number of complete transitions increased from 46 to 59. When proportions greater than or equal to 17/20, 18/20, 19/20, and 20/20 were tested using the same procedures as above, all were found to occur with statistically significant frequency (see Table 1, section II). Finally, to increase the sample of observations still further, variables number 4 and 5, scanning and controls, respectively, were deleted because of their number of missing values. The number of complete transitions rose to 72, and again the high proportions greater than or equal to 16/18, 17/18, and 18/18 occurred with significantly higher than expected frequency (Table 1, section III).

TABLE 1
Tests of Simultaneous Continuity

I. 21 variables; 46 transitions; $p=.75$.

Proportion	*Binomial Probability*	$\times N$	=	*Expected Number*	*Actual Number*	*P-Value*
≥18/21[a]	.228	46		10.5	21	.01[b]
≥19/21	.103	46		4.7	15	.0001
≥20/21	.032	46		1.5	12	.00001
≥21/21	.005	46		.23	4	.0001

II. 20 variables; 59 transitions; $p=.76$ (p has changed slightly due to deletion of variable).

Proportion	*Binomial Probability*	$\times N$	=	*Expected Number*	*Actual Number*	*P-Value*
≥17/20	.225	59		13.0	30	.0000[b]
≥18/20	.091	59		5.4	22	.0000
≥19/20	.024	59		1.5	18	.0000
≥20/20	.003	59		.2	7	.0000

III. 18 variables; 72 transitions; $p=.75$.

Proportion	*Binomial Probability*	$\times N$	=	*Expected Number*	*Actual Number*	*P-Value*
≥16/18	.135	72		9.7	26	.0000[b]
≥17/18	.040	72		2.9	20	.0000
≥18/18	.006	72		.4	9	.0000

[a] Only proportions greater than .75 need to be tested since that is the probability of a continuous link under the H_0 of independence.

[b] Normal approximation used instead of the Poisson because of the high expected number. Where there is no "b" marked, the Poisson test was used.

There was concern that the statistical significance of the demonstration of simultaneous continuity might have been due to a very high order correlation among only a few pairs of similar variables. To remove this possibility, it was decided to find the *least* intercorrelated set of variables to discover if simultaneous continuity still occurred in the reduced set of more distinct variables.

To test whether this was true, an orthogonal R-type factor analysis (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975, option PA 2) was performed, employing a varimax rotated factor matrix. The five nonenvironmental variables with the highest loading on each factor were taken. These were *tenure, controls, centralization of strategy making power, risk taking*, and *organizational differentiation*. Calculations were made to determine whether the number of times *all* five of the variables exhibited continuous links was greater than could be expected by chance given the average probability of a continuous link for the five variables (.78). The expected number of continuous links was $(.78)^5 \times 72$ or 20.8. The actual number was 28, which is greater than 20.8 at the .05 level of significance. Thus, it does seem that simultaneous continuity is due to more than high order correlations among only a few variables.

Simultaneous continuity is a powerful form of organizational momentum; a desire or at least a tendency to extend in its entirety a previous orientation. Certainly the economies of stability are not sufficient to explain the adherence to so broad an array of past practices. First, the momentum is so pervasive as to constitute a reluctance to reverse practically any orientation even slightly, no matter how cheaply it could be done. For example, where there has been a decline in the adequacy of controls, it is not expensive to set up a crude information gathering mechanism. Second, there are extensions in orientation that might be quite expensive indeed. For example, if an innovative product-market strategy has been successful in the past, it may become even more innovative in the future, and this can cost a great deal. The reasons behind momentum go beyond the constraints of economy. Three such reasons intuited from the data base are discussed: (1) Continuity is pervasive because it represents a conscious attempt to pursue an orientation that has proved to be successful. (2) Cognitive limitations cause models of reality to be resistant to reformulation. (3) The pervasiveness of continuity is caused by a reluctance or inability to disturb the intricate balance or gestalt among strategic, structural, and environmental variables.

The Formula of Success: Ideology and Power—Managers are faced with a complex concept attainment task. They must try to discover which of their actions and orientations contribute to success and which contribute to failure. Given the multiplicity of elements that must be manipulated and the assorted feedback delays that conceal their interdependence, it often is impossible for managers to know just which of their behaviors were the most useful (Bruner, Goodnow, & Austin, 1956). Thus, if a firm is doing reasonably well, there will be a strong incentive to avoid tampering with any element of a tried and true formula (Watson, 1969). Unilever

Ltd., during the early part of this century, and Litton Industries much later, centralized power at the top, actively increased product-market innovation and acquisitions, and emphasized formal information systems. As they prospered, the firms continued to move further in these directions. The information systems *seemed* useful and were extended by gathering more of the same type information. The leader had built up his reputation because of his past victories and was accorded more power, either formally or by having other executives (or board members) reluctant to negate his proposals. Thus de facto centralization kept on increasing. The same was true for the other variables. Because risk taking had been rewarding in the past, it tended to intensify. In this way past success bred pervasive continuity and turned an orientation into an ideology (Clark, 1972; Mitroff & Kilmann, 1976). Success accords more power to the initial advocates of the successful strategy. Thus vested interests and their power base become inextricably intertwined with that strategy and the political obstacles to strategic reorientation grow (Pettigrew, 1973, 1974).

Cognitive Limitations and Models of Reality—Because of the complexity of adaptive behavior, only some of the firm's practices are likely to be consciously viewed as causes of success (Watson, 1969; Argyris & Schon, 1977). The balance will be ignored. The perceived causes will be reversal-resistant because of their supposed utility, and the ignored factors will be resistant to change because they are not examined and their imbalances will be overlooked. In fact the *conscious* elements of the old strategy and structure are those most likely to be viewed as the causes of past and future success and will be extended (Watson, 1969). The less explicit elements are not included in the manager's model of reality and therefore are not tracked even though they may be flagging a crucial need for reorientation. For example, in the case of the Singer Company from 1969-1974, product diversification increased because it was believed to be useful (though in reality it detracted from success) and because it was an explicit element of strategy. However, though the diversification was too uncontrolled, rapid, and costly, and capital resources began to deplete, this was not taken seriously. Resources did not constitute an element that was tracked carefully. Also, even when obvious problems developed as new products were poorly received by markets and new acquisitions lost money, the troubles were dismissed as anomalies or fleeting conditions. Thus, the confidence in past orientations which is garnered from a protracted period of success is unlikely to be easily eroded. The events that might throw doubt upon the appropriateness of the firm's structure, strategy, or modus operandi either may not be tracked carefully or may be rationalized away in the light of past successes. So almost nothing happens that goes against the momentum.

Multivariate Interdependencies and Gestalts Among Elements of Strategy and Structure—A firm's adaptive orientation represents a tightly integrated package of environmental, structural, and strategy making elements. Many of the relationships among these elements have been suggested by Chandler (1962), Khandwalla (1972, 1973), Lawrence and

Lorsch (1967), Thompson (1967), and Woodward (1965), to name but a few. Miller (1980a) has claimed that these relationships tend to result in a number of very common and integral configurations among mutually reinforcing elements of strategy, structure, and environment. These are called gestalts, and their predictive potential has been suggested by the typologies and taxonomies of Goronzy (1969), Samuel and Mannheim (1970), Haas, Hall, and Johnson (1966), Paine and Anderson (1977), Miles and Snow (1978), and Miller and Friesen (1978, 1980). Burns and Stalker's (1961) mechanistic and organic firms, Mintzberg's (1979) adhocracy and machine bureaucracy, and Miller and Friesen's (1978) entrepreneurial and dominant firms, may all represent potential gestalts. The significance of the strategic, structural, and environmental elements of each gestalt can best be understood only after we have examined the whole configuration. Miller (1980b) has argued that any reversal of an individual variable can seriously harm the complementarities among the elements of the gestalt and is therefore likely to be resisted. Also, changes in one element are bound to be constrained by the influence of many other elements. Thus, as Khandwalla (1973) has indicated, there will be a tendency to adhere to a gestalt by keeping in alignment the rates and direction of change of the various structural and strategic elements.

This situation can be illustrated by the Ford Motor Company, which, before the war, was a stagnating bureaucracy. Ford had enacted a simple, homogeneous environment. It used routinized mass-production methods to produce a narrow line of cars that were very rarely redesigned or restyled. The firm was quite bureaucratic, power was highly centralized, and internal communications and controls were deteriorating. All of these characteristics became accentuated with the passage of time while the rate of product-market innovation declined. Though performance suffered, the integral interdependencies among elements of strategy and structure thwarted reversals in any one variable. For example, though necessary, an increase in the variety or novelty of products was unlikely. The firm did not have the organizational flexibility to undertake such changes, changes which, in any event, would have conflicted with Henry Ford's philosophy of providing the cheapest, barest, and most functional automobiles. This philosophy was enforced by Ford's financial control. The narrow product line, and the routine and simple nature of the firm's major activities, made it possible for power to be centralized in the hands of Ford and his sycophants. There was no complex administrative task to prompt decentralization. Ford's control allowed him to protract his strategies, even after they were seen to be dysfunctional by many of his subordinates. The routinized and stable nature of the structure and strategy allowed the firm's information processing apparatus to atrophy. This in turn made the hazards of the strategy less obvious. The rigid technology ensured that any prospective changes in product lines would be costly and thus doubly unpalatable. Also, the firm lacked the managerial and design talent necessary to undertake any successful reorientation. Many of the most capable people had left Ford in frustration. Thus strategy constrained structure, and structure in turn constrained strategy. All elements seemed to conspire to rule against reversals. Such configurations of tightly interdependent elements or gestalts seemed to enforce simultaneous continuity of change or stability across a great many variables.

H.3. The Development of Dramatic Dialectical Revolutions

The pervasiveness of momentum often results in excesses or extremes in many conditions. These usually cannot be undone by piecemeal and minor changes in orientation (Hedberg et al., 1976). Sometimes the extremes have been developing for a long time. Thus a watershed of dissatisfaction and operating problems has been built up, erosion of resources occurs, and a substantial revolution is needed (Miller & Mintzberg, 1974; Hedberg, 1973, 1974, 1975; Normann, 1971; Starbuck et al., 1978). Alternatively, even if the firm is doing well it may be thought desirable to seize new opportunities or to restructure. This normally requires managers to create a new gestalt among all the variables (Miller & Friesen, 1978, 1980). Sequences are called revolutionary if there are significantly many simultaneous reversals or "dialectical" links in the variables. It is hypothesized that the number of sequences in which many variables simultaneously have reversals in their direction of change, will be significantly high, in part because of the pervasiveness of momentum.

To test whether such pervasive changes were significantly common, the same hypothesis testing procedure that was used in the last section was employed. Table 2 presents the results using the identical format as in Table 1. Again the same sets of 18, 20, and 21 nonenvironmental variables were used. When the expected number of links was less than .005, testing was halted because of the impossibility of gauging significance. In all cases, the significance levels of the odd-numbered proportions that are *not* shown in the table were between the significance levels of the adjacent even-numbered proportions. The results once again are highly significant.

To check whether there was any revolutionary tendency among the most unrelated variables, the five variables that had the highest loadings on the orthogonal varimax rotated factors were again used. Under chance one would expect the number of links in which three or more out of the five variables reverse themselves simultaneously to be (from the binomial distribution) $.0744 \times 72 = 5.36$, the average proportion of time the five variables exhibit reversals being .22. The actual number was nine. This number is almost twice as large, but it is only significant at the .098 level. Thus there seems to be a tendency towards simultaneous changes even in the set of least correlated variables, but this finding must remain tentative.

Views on the causes of revolution are rather tentative and derive from 11 anecdotal descriptions contained in the data base. Momentum tends to culminate in a revolution only under rather significant pressures. The first are shifts in power that allow the emergence of a new organizational ideology and strategy. The second are significant performance deteriorations

TABLE 2

Tests of Simultaneous Reversals

I. 21 variables; 46 transitions; $p = .25$.

Proportion	*Binomial Probability*	×*N*	=	*Expected Number*	*Actual Number*	*P-Value*
≥10/21	.0183	46		.95	6	.0003
≥12/21	.0014	46		.0644	5	.0000
≥14/21	.0005	46		.0230	2	.0000
≥15/21	0	46		0	1	N/A

II. 20 variables; 59 transitions; $p = .24$.

Proportion	*Binomial Probability*	×*N*	=	*Expected Number*	*Actual Number*	*P-Value*
≥10/20	.0238	59		1.4	7	.0006
≥12/20	.0019	59		.12	5	.0000
≥14/20	.0001	59		.0059	2	.0001

III. 18 variables; 72 transitions; $p = .25$.

Proportion	*Binomial Probability*	×*N*	=	*Expected Number*	*Actual Number*	*P-Value*
≥ 8/18	.0847	72		6.12	11	.05
≥10/18	.0110	72		.792	6	.0002
≥12/18	.0005	72		.03	4	.0001

that provoke encompassing remediality. Each entails rather widespread and significant departures from previous directions of evolution and involves the creation of a new gestalt among variables of strategy, structure, and environment. The first force is opportunistic and positive, and the second is reactive and remedial.

Revolutionary organizational reorientation may occur when there is a major shift in power among management groups of differing ideologies and perspectives. Effective leadership might pass, for example, from a conservative team of executives with a production background to a bold cadre of managers who are marketing and financial specialists. There are a number of ways in which a radically different leadership group can ascend to power. Occasionally, a former leader departs without having groomed a successor so that no executives remain who have been amply steeped in the traditional ideology. Perhaps there exists in the organization a team with a brilliant track record; even though they have a different approach their record almost dictates their rise to power. Alternatively, a dearth of successors might prompt the recruitment of a key executive from another firm who begins to bring in other outside men. Finally, dramatic changes in management may occur because of mergers and acquisitions.

New leaders often bring with them a dramatically different concept of the business; a radically new perspective of the nature of the firm, its goals, strategies, and evolutionary directions. Kuhn, in analyzing the major revolutions in science, provides an apt analogy for what happens in an organizational revolution, when the new leaders begin by:

> "picking up the other end of the stick" a process that involves "handling the same bundle of data as before, but placing them in a new system of relations with one another by giving them a different framework" (1970, p. 85).
>
> Almost always the men who achieve these fundamental [reconceptualizations]...have been either very young or very new to the field [read "from outside the organization"] (1970, p. 90).

Encompassing remediality can also overcome momentum, causing the abandonment of a basic orientation or evolutionary direction because of *perceived* failures; that is, failures of objectives that are tracked and held to be important under the old ideology, or failures that are so devastating that they provoke a crisis that simply cannot be explained away as a fleeting condition or as an insignificant anomaly. A new realignment among variables of strategy, structure, and environment takes place as directions of evolution are reversed on many fronts. Extending the earlier analogy, Kuhn states:

> Scientific revolutions are inaugurated by a growing sense...that an existing paradigm has ceased to function adequately in the exploration of an aspect of nature to which that paradigm *itself* had previously led the way (1970, p. 92).

Two of the most common examples of revolution found in the published sample illustrate why revolutionary changes are so significant.

Another Leader and a Different Strategy: Creating a New Gestalt—Occasionally, a new leader enters a firm with a new strategy that causes broad reversals in the direction of evolution of the structural and decision making orientations (Starbuck et al., 1978). For example, when Kurt Lotz took over from Heinrich Nordhoff at Volkswagenwerk, he undertook to renew the product-market strategy by producing new types of cars and entering different market segments. This was accomplished by creating and acquiring new divisions and subsidiaries and by introducing new models. So a whole set of structural parameters began to evolve in a different direction to become consonant with the strategy. (This process has been described by Chandler [1962], Channon [1973], and Rumelt [1974].) In essence, a new gestalt was established among the variables of strategy and structure. Volkswagenwerk (1966-1973) went from a one-product, unified, functionally structured, increasingly conservative and centralized firm operating in relatively stable markets, to a multiproduct, diversified, divisionalized, risk-embracing organization operating in several more dynamic market segments. It is interesting that this revolution failed because it was incomplete; that is, there were still too few reversals. Lotz reserved too much power for himself, protracting a trend that had been established under Nordhoff. Also, the decline in the efficacy of scanning and control systems was not arrested. Both problems were aggravated by the new strategy that boosted the complexity of the administrative task.

A very similar revolution took place at General Motors. In 1916 William Durant took over from some conservative banker-trustees whose task it was to consolidate the firm and bring about better coordination and central control. Durant began to expand product lines carelessly and to purchase new companies. But he neglected to control and monitor his new divisions and subsidiaries. In a comparison between the trustees' and the Durant years, it is seen that reversals occurred in the direction of evolution in attitudes toward innovation and risk, the efficacy of scanning, control, and communication systems, and the degree to which decision making was analytical, multiplex, and integrated. Once again it seems that a dramatic change occurred in the gestalt as General Motors moved from a conservative–bureaucratic to a bold-intuitive orientation.

Some very common gestalts among environmental, organizational, and strategy making elements have been found in the literature. Their number tends to be rather small and their elements are integrally connected and mutually reinforcing. See the arguments of Miller (1980a) and the findings of Goronzy (1969), Khandwalla (1973), Miles and Snow (1978), Samuel and Mannheim (1970), and Miller and Friesen (1978, 1980). It seems also that gestalts are very different from one another (Miller, 1979, 1980b). Thus, after any major reversal in orientation, in order for a new gestalt to emerge rebuilding must take place on many fronts. This entails a reversal in orientation in many areas. In other words, widespread change normally occurs so that all of the elements needed for the new gestalt can fall into place. Piecemeal changes result in internally inconsistent and therefore potentially dysfunctional configurations (Miller, 1980b). It is dangerous, for example, for a bureaucratic firm to enter more turbulent markets without priming its information processing systems, giving more authority to boundary spanning units, and increasing technocratization and product innovation.

All-Encompassing Remediality—Between 1969 and 1974, the Singer Company expanded rapidly and recklessly. It acquired a complex set of businesses, many of which began to cause much trouble. The firm had undergone a period of increasingly bold expansion and accelerating innovation. Power had become more centralized under an entrepreneurial chief. Intelligence efforts deteriorated as there were mounting internal communications problems and diminishingly adequate controls. Subunits were less in touch with each other and with the busy man at the top. Again, there was a need to reorient dramatically *many* facets of the organization. This was done from 1975 to 1978 by getting rid of the powerful entrepreneur whose ideology and bold moves originally got the organization into trouble. The old leader's departure made a serious change in orientation possible. New executives recognized the need to decentralize power somewhat to cope with the size and diversity of the organization. Also, because organizational resources had been badly depleted by ill-conceived ventures and problem-ridden subsidiaries, better intelligence systems, administrative rationalization, and a more conservative product-market strategy were implemented. Again, many past changes were reversed as the firm tried to catch its breath.

It seems that because continuity was so pervasive, it caused excesses in many realms. Remedies were therefore required in the power structure, methods of decision making, attitudes towards risk, information systems, innovative practices, etc. Thus, even where the concern is not with erecting a new gestalt but merely with solving a few problems, the roots of such problems often run very deep and have widespread influences which have to be combatted.

Both the creation of new gestalts and encompassing remediality seem to account for the frequency with which widespread reversals happened in the sample. In the first case a major change, perhaps in strategy or leadership, causes many subsequent realignments in decision making and structure. In the second, organizational momentum that derives from economic, emotional, power, gestalt, and cognitive forces results in many excesses. These are countered by dramatic revolutions which reverse former orientations in a highly multifaceted way.

PERFORMANCE AND ADAPTATION

The model of organizational adaptation initially was expected to have performance implications. Three performance related hypotheses were tested. It seemed likely that the first period of a revolutionary interval would exhibit a decline in performance that would motivate organizational reorientation. Unfortunately, the maximum number of revolutions in the sample was only 11 (when 18 variables were used and a minimum of 8 reversals defined a revolution). There were seven declines in performance during the first period, two improvements, and two no-change ratings (which were ignored). A binomial population proportion of .5 was adopted as the null hypothesis. This asserted that increases and decreases in performance are equally likely in the first interval of a revolution. It was only possible to reject the null hypothesis at the .09 level of significance. The published accounts showed four cases in which shifts in power with accompanying opportunistic ideologies rather than performance declines triggered the revolution. But there is evidence that failure is most often the key revolutionary stimulus.

It also was believed that revolutions would usually result in an improvement in performance. In the second period of the 11 revolutions, 7 improvements in performance, 2 declines, and 2 no-change ratings were found. Again the earlier null hypothesis could not be rejected at beyond the .09 level. Perhaps a larger sample will establish the robustness of the finding. A very tentative conclusion is that revolution usually results in performance amelioration, but there are dramatic exceptions.

Finally, it was believed that pervasive momentum would cause a deterioration in performance due to sluggish adaptation. Using the criterion of 16/18 continuous links for the 18 variables, 26 periods of pervasive continuity were found. During the second period of each pair, 8 improvements in performance, 6 declines, and 10 no-change scores were found, clearly a statistically insignificant finding. Thus the performance implications of momentum are by no means clear. There seemed to be a number of reasons to account for the inability to establish unambiguous performance implications concerning momentum and revolution:

1. Momentum may be just as often functional as dysfunctional. It can serve to keep features of strategy, structure, and environment in proper alignment over time. It is also economical in the sense that it forestalls expensive and disruptive reversals which can alienate personnel, absorb material and financial resources, and necessitate much organizational learning, often by costly trial and error. Finally, it avoids a hair-trigger adaptiveness which whipsaws the organization in and out of ventures that take time to come to fruition. But momentum also can be very costly when it protracts an orientation that has proved to be dysfunctional.
2. Revolutions are similarly ambiguous in their performance implications. Some revolutions bring to life a somnolent, deteriorated organization and renew its structural and strategic orientations to bring them more in line with challenges in the market. Other revolutions reverse a perfectly good strategy or structure because of the aims of a new chief executive, an overreaction to a threat, or a perceived opportunity. Also, all revolutions are costly and many pay off late, or never.
3. Even if there were a link between performance and the mode of adaptation it is not all that surprising that it could not be found. There is much variation in the time it takes for performance to be influenced by decisions and events. In some cases, the period definition heuristic may capture a decline/improvement in performance during the second of a pair of periods; in other cases, a greater time lag might make this impossible.
4. A final problem is that performance data for the early periods of history in firms such as Ayer, Macy's, Whitin, Waltham, and Unilever were missing, incomplete, or approximate and the sample of revolutions was small.

Others are encouraged to explore the link between performance and adaptation. The failure here to establish a relationship should be construed more as a shortcoming of the research than as the final word on the subject.

CONCLUSION

The three major findings of the paper are preliminary and somewhat tentative. They do suggest, however, possible research foci for subsequent investigators:

1. A topic more relevant than resistance to change in the study of organizational adaptation may be the tendency toward momentum. A very significant bias was found in favor of the proportion of continuous links. Reversals in the direction of change were relatively rare for *all* nonenvironmental variables. Thus, entrepreneurial firms may become excessively entrepreneurial if they begin to move in that direction, just as stagnant-bureaucratic firms can become excessively risk averse and rigid. Instead of

studying only stagnation, momentum may serve as an interesting focus as it influences adaptive dysfunctions in organizations.

2. Momentum is a pervasive phenomenon. Continuous links breed more continuous links; that is, the presence of a continuous link for one variable is significantly associated with continuity in the other variables that do not correlate highly. Across-the-board momentum (continuity) occurs more frequently than can be explained by chance. An examination of the historical accounts revealed that explanations for this might lie in a reluctance to tamper with tried and true formulas, the effects of cognitive limitations, gestalts or integral relationships among environmental, organizational, and strategy making orientations, and the nature of the forces of power and ideology.

3. Revolutions that display reversals for a high proportion of variables also occur with very significantly high frequency. These major reorientations seem to take place because *many* excesses or deficiencies have developed during periods of pervasive momentum or because a new strategy requires realignments among many variables. Thus there follows a myriad of structural and strategic reversals.

Organizations seem to evolve in a manner that is quite similar to the development of scientific knowledge. Kuhn portrays progress in science as "a succession of tradition-bound periods punctuated by non-cumulative [revolutionary] breaks" (1970, p. 208). Scientific inquiry is both constrained and made more penetrating and cohesive by paradigms that delineate operative assumptions and orientations. A paradigm is not dispensed with just because some anomalous findings run counter to its predictions. Abandonment is prompted only by serious crises coupled with the emergence of more powerful paradigms, a situation Kuhn calls a "scientific revolution." Unfortunately, revolution may occur only many years after initial anomalies are recognized, and inquiry tends to be biased in scope, theme, and direction. But science is integrated and channelled by paradigms in a manner that makes for a more efficient, rapid, and complementary growth of knowledge. Indeed, if scientific theories were extremely amenable to change, altering with every surprising result, disorder and chaotic fragmentation would thwart the emergence of a sufficiently encompassing level of theoretical abstraction to focus and systematize research.

In the same way, organizations evolve consistently in accordance with a perspective, strategy, ideology, and mission of their own; concepts that are manifested by an integral alignment or gestalt among environmental, organizational, and strategic variables. To reverse the trend of evolution and abandon this orientation in the face of every problem would be exceedingly costly and would result in many discrepancies and imbalances. Major stimuli are required to prompt a revolution. Managers demand a large potential benefit before they are willing to destroy the order and complementarity of elements inherent in the old gestalt and begin to construct a new one. The price paid for this is sluggish responsiveness to the need for reversals in evolutionary trends, and occasional revolutionary periods with all of their turmoil, expense, and confusion. It is instructive to note, however, that a major difference between scientific revolutions and organizational ones is that the former are often said to occur *only* in response to a crisis but the latter can be proactive as well.

At this stage it is important to interject a note of caution in interpreting the findings. The focus has been on significant general tendencies, not conditions that hold for *all* historical sequences. Together sequences of pervasive revolution and pervasive momentum account for only a part of the sample; obviously then there are incremental and piecemeal sequences of reversals and momentum. The only contention here is that the findings represent significant tendencies in the sample, not that they exhaust all of the possibilities.

We hope that these results will encourage other researchers to look more closely at corporate histories to gain further insights into the dynamics of adjustment. Broader samples, more concrete variables, and a concentration on shorter time periods or refined time series data might all add significantly to the findings. A study of the process of adaptation as it evolves over time can bring much more understanding about the pitfalls and challenges facing strategists and designers of organizations.

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The Administrative Component in Growing and Declining Organizations: A Longitudinal Analysis[1]

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In a longitudinal study on 24 school districts the analysis of data over a 10-year-period indicates that (1) the relationship between size and the administrative component observed in cross-sectional designs does not obtain when organizations are individually analyzed and (2) relationships between size and personal components in declining school districts do not parallel those observed in growing districts.

This paper reports the results of a study to determine (1) whether relationships observed in cross-sectional design studies of administrative components obtain within organizations when a longitudinal within-organization analysis is conducted and (2) the relationship between size and various personnel components *within* growing and declining organizations. A brief review of two problems found in previous studies on administrative components is presented. Based on this review, four hypotheses are proposed and tested.

Determining the relationship between an organization's size and its structure continues to be a subject of interest to students of organization (Ford & Slocum, 1977; Kimberly, 1976b). Of the relationships studied between size and structure, none has been the subject of more extensive investigation than the one between size and the administrative component. With few exceptions, for example, Tsouderos (1955), the preponderance of this research indicates that as size increases, the proportion of administrative personnel decreases (Freeman & Hannan, 1975; Lindenfield, 1961; Hendershot & James, 1972; Hinings & Bryman, 1974; Tosi & Patt, 1967;

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Anderson & Warkov, 1961; Haas, Hall, & Johnson, 1963; Bendix, 1956; Blau, 1970; Rushing, 1967; Klatzky, 1970; Akers & Campbell, 1970).

The rationale offered (Blau, 1970) for this negative relationship is that increases in size, through their effect on structural differentiation, increase control and communication problems. To cope with these problems, additional numbers of administrative personnel are needed. In this respect, size has a positive and indirect effect on the administrative component. The indirect effect is offset, however, when economies of scale in administration are realized from the more efficient use of specialists and greater within-unit homogeneity resulting from larger subunits. Because the economies of scale are greater than the problems created by increased differentiation, there is less than a proportionate increase in the administrative component as size increases.

Although the studies finding a negative relationship between size and the administrative component vary in terms of the organizations sampled and/or the measures used, they nevertheless have at least one of two characteristics in common. The first commonality is that all the studies—exceptions being Haire (1959) and Holdaway and Blowers (1971)—employ a cross-sectional design and infer that the resulting patterns observed between organizational size and the administrative component reflect individual organization growth curves. That is, the inference is made that the cross-sectional curve obtained by the plotting of the administrative component against size across different organizations represents the way in which the administrative component changes within an organization as the organization grows (Holdaway & Blowers, 1971; Akers & Campbell, 1970). In this respect, cross-sectional results are interpreted as indicative of processes within organizations (Kimberly, 1976a). If a cross-sectional design indicates that the administrative component decreases proportionately with increases in size, for example, the inference and assumption is made that this same relationship will obtain within an organization as it increases in size. There is, however, a problem with this inference and its corollary assumption.

Kimberly indicates that interpreting cross-sectional results as within organization processes necessarily assumes "that all organizations go through identical, or at least similar, processes of structural evolution and that environmental and/or contextual influences are either constant or random" (1976a, p. 326). Given existing evidence and theory, such an assumption is clearly questionable. Moreover, Haire (1959) maintains that cross-sectional designs generate spurious growth curves in that resulting curves reflect a set of static measurements ordered by size across organizations rather than the dynamics within an organization. In this respect, Holdaway and Blowers (1971) found the expected negative relationship between size and the administrative component when employing a cross-sectional design, but no consistent relationship when each organization was analyzed individually over a five year period. Because the "growth" curves generated by cross-sectional designs may have little resemblance to the growth curves individual organizations actually exhibit, inferences regarding the relationship between structure and growth in individual organizations made from cross-sectional designs may be of questionable validity (Bakan, 1954; Hayes, 1953; Estes, 1956; Hyland & Foot, 1974; Firebaugh, 1978). Rather, the study of the relationship between organization structure and growth implies the examination of that relationship on a longitudinal basis *within* organizations.

Ironically, this limitation of cross-sectional designs is not necessarily overcome in studies using longitudinal data (Hendershot & James, 1972; Freeman & Hannan, 1975; Akers & Campbell, 1970). Rather, the longitudinal data are used to assign an organization to one of several growth categories or groups based on the degree of change in size. Once the organizations are assigned, the study reverts to a cross-sectional design in that relationships are computed between variables across (rather than within) the organizations comprising each category. The resulting relationships then are compared and inferences drawn. As in other cross-sectional studies, the inference is made that the organizations within each category follow the cross-sectional relationship computed for that category and that organizations grow according to the pattern indicated by the comparisons across categories. Hayes (1953), however, indicates that such inferences are valid only if the cross-sectional relationship is representative of the relationship found between those same variables when each organization is individually analyzed, i.e., when a within-organization analysis is conducted. A within-organization analysis was not conducted in previous studies using longitudinal data. Thus the extent to which the relationships observed obtain for individual organizations is not known.

In addition to the cross-sectional design limitation, prior studies using longitudinal data are found wanting for another reason. In some cases, for example, Akers and Campbell (1970) and Hendershot and James (1972), the longitudinal data are limited to only two points in time. Consequently, fluctuations in either growth or the administrative component between these two points are ignored. Because there may be a lag in the relationship between growth and the administrative component (Hendershot & James, 1972; Freeman & Hannan, 1975), the failure to consider at least some of the intermediate points could result in spurious findings. On the other hand, where contiguous time periods have been considered (Freeman & Hannan, 1975; Holdaway & Blowers, 1971), the total time period considered (five years in each study) may not have been sufficient to allow growth patterns to stabilize. As a result, inappropriate conclusions may have been drawn.

In view of these considerations, the following hypotheses are posited.

H1: In a cross-sectional design, the administrative component will increase at a less than proportionate rate with increases in size.

H2: The cross-sectional relationship observed between size and the administrative component will not correspond with the longitudinal relationship observed within *each organization.*

The second characteristic common to studies on the relationship between size and the administrative component is that each, with the exception of Freeman and Hannan (1975), has focused exclusively on the relationship between the administrative component and increases across organizations in size and has ignored what happens to the administrative component with decreases in size. In this respect, these studies make the assumption that the administrative component behaves the same in both growing and declining organizations (Freeman & Hannan, 1975; Aldrich, 1979). This assumption, however, appears to be invalid.

Hendershot and James hypothesize from their findings that "in a sample of organizations with declining or stable size, the negative relationship between size and the administrative component would disappear altogether or be reversed" (1972, p. 151). That is, the relationship between size and the administrative component would be different during growth and decline. Data presented by Tsouderos (1955) support such a difference. A replotting of the data from his study of 10 voluntary organizations indicates that the number of administrative personnel increased more during decline than during growth. That is, rather than reducing the administrative component as membership contracted, it was increased.

Contrary to the data presented by Tsouderos, in their study of school districts Freeman and Hannan (1975) indicate that the administrative component is reduced in declining districts, but at a slower rate than it is increased in growing districts. In particular, they found that a decline in enrollment of a magnitude equal to an increase in enrollment did not result in the same magnitude of change in the administrative component. Rather, the rate of change was slower in declining than in growing districts.

Data presented by Akers and Campbell (1970) in their study of occupational associations further cloud the nature of the relationship between size and the administrative component during decline. Specifically, their data indicate that the administrative component of some declining organizations increased over the period of their study. Akers and Campbell did not discuss or further examine this relationship, so it is not clear if the increase is attributable to the addition of more personnel (Tsouderos, 1955) or to a slower rate of removal of administrators (Freeman & Hannan, 1975). Other data presented by Akers and Campbell (1970), however, suggest that both the addition of more personnel and the slower removal of administrative personnel may account for this relationship.

Although the evidence regarding the relationship between size and the administrative component suggests that this relationship is different during growth and decline, the exact nature of that relationship is not well established. Moreover, because each of the three preceding studies suffers from the cross-sectional design limitation characteristic of studies in this area, their findings must be accepted as tentative when applied to the growth processes within individual organizations. Nevertheless, their findings do suggest the following hypotheses:

H3: The cross-sectional relationship observed between size and personnel components in growing (declining) organizations will not correspond to the relationship observed within *growing (declining) organizations when a longitudinal analysis is done.*

H4: The relationship observed between size and personnel components in growing organizations will not parallel the relationship observed in declining organizations.

METHOD

Population

The population for this study consists of the 24 school districts comprising the Maryland public school system. No private or parochial schools are included. Because Maryland public schools are centralized at the county level, the unit of analysis is the school district, and no inferences are made to the individual schools within the district (Firebaugh, 1978). Data on each school district for the 10-year period 1968 to 1977 were obtained from the Maryland Department of Education annual reports. Data prior to 1968 were not used for reasons of comparability. Because this is a population and not a sample, levels of statistical significance are not reported.

Variable Measures

Size—In his review of the literature, Kimberly (1976b) identifies four different aspects of size. The first, physical capacity, refers to the amount of production or work the organization is capable of doing as determined by its physical plant (e.g., square feet of space). A second aspect, personnel available, refers to the finite amount of labor with which the organization has to do its work. It is this measure that has been used in most studies dealing with size (Ford & Slocum, 1977). The third aspect of size is the volume of inputs and outputs and reflects the level of activity to which the organization is exposed (e.g., demand for product). Finally, Kimberly identifies discretionary resources, such as those indicated by net assets or wealth, as an aspect of size.

Although the four aspects of size identified by Kimberly have been shown to be highly correlated (Child, 1973), Kimberly nevertheless argues that they have conceptually distinct significance for organization structure. For example, he indicates that personnel available are likely to be the most relevant to the issues of social control, whereas physical capacity and activity volume are more relevant for problems of work structure (e.g., differentiation and specialization). Because of the conceptual differences, Kimberly cautions that that aspect of size most relevant to the aspect of structure under investigation should be selected. The problem with administrative personnel is that they are involved in activities that relate to all aspects of size identified by Kimberly. They are involved in issues of social control (they are a means of control) and work structure (they are a form of specialization), and they deal with and are affected by issues of resource availability and allocation (Freeman, 1979). Moreover, because it is not clear what percent of their time is devoted to each issue or how the responsibility for the issues is allocated among administrative personnel, it is not possible to select the most appropriate measure of size. But this does not mean that the various aspects of size are expected to have the same effect on administrative personnel.

Blau (1973) and Freeman and Hannan (1975) indicate that some supportive personnel are linked as much or more to the school as to the student. That is, the existence of a school requires certain personnel (e.g., maintenance) who are not associated with instruction per se. Therefore, it would be expected that the administrators of noninstructional support personnel would be affected more by changes in physical capacity than would the administrators of instructional personnel.

In view of these considerations, the following measures of size are used:

(1) Physical capacity: the total *number of schools* in the school district.
(2) Personnel available: (a) the total *number of instructional personnel*, which includes teachers, librarians, guidance counselors, audiovisual personnel, psychologists, and secretaries and clerks associated with instruction; (b) the total *number of noninstructional personnel*, which includes health, food service, operation of plant, maintenance, and transportation personnel, as well as secretaries and clerks not associated with instruction. Each of these is treated separately because they are likely to affect different administrative personnel.
(3) Volume of inputs: the total *enrollment* in grades kindergarten through twelve.
(4) Discretionary resources: the total *revenues* from federal, state, and local sources.

Administrative Component—Consistent with the preceding discussion and the personnel available measure of size, (2) above, administrators are categorized as instructional or noninstructional. Instructional administrators (IADM) include assistant superintendents, principals, vice principals, and the directors and supervisors of personnel involved with instruction (e.g., librarians). Noninstructional administrators (NIADM) include superintendents, assistant superintendents, and the directors and supervisors of noninstructional personnel (e.g., maintenance).

Other Personnel Components—This study also is concerned with comparing what happens to various personnel components other than administrators in growing and declining organizations. Thus the following personnel categories are included:

(1) Professional personnel (PROF): those requiring knowledge and skills acquired through formal training including skills in education

or education psychology. These include librarians, counselors, psychologists, and audiovisualists but not teachers.

(2) Teachers (T): those professional personnel assigned to instruct students.

(3) Instructional secretaries/clerks (ISC): those involved with servicing the instructional function.

(4) Noninstructional secretaries/clerks (NISC): those who service all functions other than instruction.

(5) Noninstructional personnel (NIP): personnel other than secretaries/clerks who are classified in health and food services, pupil personnel, operations and maintenance of plant, and transportation.

The assignment of personnel to the various categories is based on the assignments found in the Maryland Department of Education annual reports.

RESULTS

The first hypothesis argues that increases in size are associated with increases in administrative personnel but that the percentage change in administrative personnel is less than the percentage change in size. This suggests that the first hypothesis may be tested by using *size elasticity*, where elasticity is defined as the percentage change in the administrative component divided by the percentage change in size and where the change is measured from the mean of each variable (Pindyck & Rubinfield, 1976). Accordingly, where the percentage change in the administrative component is the same as the percentage change in size, size elasticity is 1. Alternatively, where the percentage change in the administrative component is greater than the percentage change in size, size elasticity is greater than 1, and where the percentage change in the administrative component is less than the percentage change in size, size elasticity is less than 1. Therefore, the first hypothesis argues that size elasticity will be positive and less than 1.

To test the first hypothesis, a simple regression was performed by regressing the measures of size, one at a time, on the administrative components. Simple, rather than multiple, regression was performed because Hypothesis 2 requires comparing the results from Hypothesis 1 to those obtained from a within-district analysis for each of the 24 school districts. In addition, each district has only 10 data points (10 years); thus multiple regression on a within-district basis would not give reliable results. Finally, tests (Durbin-Watson) indicated that autocorrelation in the dependent variable was not significant, and thus a lag of the dependent variable was not included. Size elasticity is taken from the beta coefficient elasticity reported as part of the regression output in SPSS (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975).

The cross-sectional design regression results, shown in Table 1, give mixed support for the first hypothesis. In particular, instructional

TABLE 1
Size Elasticity: Cross-Sectional and Within Design Results

	Instructional Administration				Noninstructional Administration			
	Enrollment	*Schools*	*Instructional Personnel*	*Revenues*	*Enrollment*	*Schools*	*Noninstructional Personnel*	*Revenues*
Cross-Sectional Design:	.92	1.04	.96	.83	1.18	1.35	.88	1.13
Within District								
1	-.07	-.75	3.39	.25	-3.47	-3.39	-.84	.40
2	.59	1.07	.56	.18	4.63	2.96	.56	.56
3	-1.03	-.71	-1.33	.44	-.70	-6.76	.84	.23
4	-.37	1.99	.29	.21	-6.10	6.18	1.26	1.07
5	2.56	3.17	1.38	.61	.29	1.76	.02	.09
6	-.49	.10	.08	-.05	-4.16	1.37	-.49	.54
7	1.17	1.95	.98	.37	1.91	1.11	.39	.64
8	.98	1.64	.58	.17	-.01	.00	.00	.01
9	1.83	2.08	1.65	.79	.68	1.04	.31	.27
10	.77	.04	-1.03	-.04	-6.96	-.68	.40	1.12
11	1.47	2.76	1.44	.42	-.83	-.92	-.27	-.12
12	-.13	-.14	1.58	.35	4.40	-2.83	.02	.95
13	1.96	3.49	1.05	.34	2.29	4.33	.34	.42
14	1.07	.92	.86	.40	1.22	1.04	.22	.57
15	.83	.19	-1.56	-.24	2.66	-.31	.00	-.50
16	-.27	.47	-.72	.09	-2.85	5.33	1.34	1.05
17	-.48	1.66	.23	.24	-.63	10.31	2.65	1.15
18	-.18	.49	-.70	-.17	15.31	-4.21	-.26	1.50
19	1.07	1.76	.81	.22	-.73	1.59	.19	.09
20	-1.34	-1.19	.67	.29	5.21	10.37	1.14	-1.54
21	-.56	-3.87	.97	.52	-1.79	1.23	.51	.12
22	-.48	-.47	1.57	.27	-5.28	3.41	1.05	.62
23	-2.01	3.37	2.20	.42	-8.46	11.91	1.04	1.32
24	-1.10	.11	.49	.15	a	a	a	a

[a] Noninstructional administrative personnel was a constant over the 10-year period in this district.

administrative personnel tend to change at a slightly slower rate than enrollment, instructional personnel, or revenues (supports hypothesis), but at a slightly faster rate than schools (does not support hypothesis). Noninstructional administrative personnel, on the other hand, change at a noticeably slower rate than noninstructional personnel (supports hypothesis), but at a noticeably faster rate than enrollment, schools, and revenues (does not support hypothesis).

The second hypothesis posits that the preceding cross-sectional design results will not obtain within each school district when a within-district longitudinal analysis is performed. The data, shown in Table 1, support this hypothesis. With respect to instructional administrative personnel, the enrollment elasticities are negative in the majority of districts (54 percent) even though the cross-sectional design results indicate a positive elasticity. Moreover, the revenue elasticity is considerably less than that indicated by the cross-sectional design results. In fact, in 21 (87 percent) districts the revenue elasticity is less than .50 (absolute value) as compared to .83 in the cross-sectional design. Even in the case of the school and instructional personnel elasticities, which are positive in 18 (75 percent) and 19 (79 percent) districts, respectively, the magnitude of elasticity varies considerably from that observed in the cross-sectional design results. Similar results also are obtained with respect to noninstructional administrative personnel. Thus it may be concluded that the cross-sectional design results do not obtain, either direction or magnitude of relationship, within the districts comprising the design.

The within-district results also show that instructional administrators tend to be most responsive (based on rank ordering of the absolute values of elasticities) to changes in the number of schools, secondarily to the number of instructional personnel, then to enrollments, and they are least responsive to changes in revenues. Noninstructional administrators, on the other hand, are most responsive to changes in the number of schools, secondarily to enrollments, then to noninstructional personnel, and they are least responsive to changes in revenues. Noninstructional administrators are also more responsive (based on magnitude of elasticities) than instructional administrators to changes in schools, enrollments and revenues, but less responsive to changes in personnel. This suggests that although both types of personnel are involved in the structural issues associated with each measure of size, instructional administrators tend to be more involved in such issues as social control, whereas noninstructional administrators tend to be more involved in work structure issues.

One reason districts may not exhibit the same within-district relationship between size and the administrative component as evidence in the cross-sectional design is that both growing and declining school districts are included in the cross-sectional design. If, as is suggested in the fourth hypothesis, districts in these respective categories exhibit different relationships between personnel components and size, then their inclusion in the same cross-sectional design could bias the findings (Kimberly, 1976a).

Therefore, it is necessary to distinguish between growing and declining school districts.

Originally it was felt that the growing and declining categories could be established using any of the three measures of size. This was not the case. Rather, it was found that a school district classified as a decliner based on enrollment changes might be a grower based on the number of schools. In fact, of the 11 school districts ultimately defined as declining, only 1 was classified as a decliner using the number of schools. In one case, a school district in which enrollment declined every year increased the number of schools every year. Similarly, no school district realized a decrease in total revenues. For these reasons, changes in the number of schools or revenues were not used as the basis for categorization. The use of total instructional or noninstructional personnel also would be problematic in that the various personnel components to be analyzed are used in computing the totals. Consequently, there would be a necessary dependency between size and the personnel components that could bias the results (Freeman & Kronenfeld, 1974). Therefore, changes in enrollment were used to categorize school districts as growing or nongrowing. Change in enrollment is also the measure used by administrators when discussing growth and decline. Accordingly, a declining school district is defined as one that realized a decrease in enrollment every year since 1968, and a growing district is one that realized an increase in each year. School districts showing a combination of increases and decreases were classified as mixed. This definition produced 6 growing, 11 declining, and 7 mixed school districts.

Given the three growth categories, one issue of interest is the extent to which the cross-sectional design results differ for each category. As is seen in Table 2, the cross-sectional design results for each category are essentially the same. Thus, it does not appear that the overall cross-sectional design results (Table 1) were influenced by the type of growth history school districts exhibited.

According to the third hypothesis, the cross-sectional design results for each growing and declining category will not give the same relationship as the longitudinal analysis on each district within the respective categories. The data, shown in Table 2, give mixed support to this hypothesis. In the case of growing districts, the cross-sectional results suggest that as a district grows, each of its personnel components except noninstructional administrative personnel will increase by approximately the same percentage (e.g., a 1 percent increase in enrollment will give a 1 percent increase in the personnel component). The longitudinal results support this in terms of the direction of change (increase) but not in terms of the magnitude of change. Rather, in 35 cases (83 percent) the enrollment elasticity is greater within growing districts than that indicated by the cross-sectional results. That is, personnel components tend to grow at a faster rate than enrollments. Thus, with respect to the growing districts, it may be concluded that the cross-sectional results are an accurate indicator of the direction of the relationship between size and personnel components, but not of the magnitude of the relationship.

TABLE 2
Enrollment Elasticity for Growing and Declining School Districts

	NIADM	*IADM*	*PROF*	*T*	*ISC*	*NISC*	*NIP*
Overall Cross-Sectional Design	1.18	.92	1.00	1.00	.94	1.06	1.09
Growers							
Cross-Section	.50	.87	.97	1.03	.92	.82	1.15
5[a]	.29	2.56	4.57	1.78	1.36	4.20	4.62
7	1.91	1.17	3.08	1.03	1.43	2.04	2.00
9	.68	1.83	2.55	1.14	.82	1.53	2.20
11	-.83	1.47	.72	.66	1.09	1.73	2.06
13	2.29	1.96	2.70	1.84	1.54	2.99	6.71
14	1.22	1.07	.40	1.27	.97	1.62	2.06
Decliners							
Cross-Section	1.15	.93	.99	.99	.98	1.10	1.03
1	-3.63	-.07	-3.28	.21	.04	.91	.08
3	-.70	-1.03	.42	.17	.08	2.23	-.30
4	-6.10	-.37	-1.04	.32	.43	1.58	-.74
10	-6.96	.77	-1.89	-1.50	-8.43	-2.86	-8.14
15	2.66	.83	-.07	.18	-.96	-.60	.33
17	-.63	-.48	-.01	.60	-1.82	-.46	.53
20	5.21	-1.34	-4.02	-.90	-4.19	.42	-5.47
21	-1.79	-.56	.11	-.19	-.67	-1.58	1.47
22	-5.28	-.48	-5.18	-.92	-5.98	-.62	-3.73
23	-8.46	-2.01	.06	-.75	-1.24	-3.54	-4.42
24	[b]	-1.10	-1.51	-1.44	-2.09	-2.39	-3.59
Mixed							
Cross-Section	1.29	.97	1.08	1.03	1.07	1.10	1.08
2	4.63	.59	1.64	1.47	.16	.03	4.59
6	-4.16	-.49	-6.10	-1.53	-6.51	-1.87	-13.98
8	-.01	.98	.27	1.39	.65	2.09	4.37
12	4.40	-.13	4.07	2.83	8.59	4.41	4.32
16	-3.85	-.27	-.91	.22	-.10	-1.24	-1.22
18	15.31	-.18	-.74	1.24	5.14	-7.79	-1.84
19	-.73	1.07	2.70	1.69	.46	1.49	1.00

[a] District number.
[b] NIADM was constant.

The cross-sectional design results for declining school districts suggest that as enrollments decline, each of the personnel components also will decline at approximately the same rate. The within-district analysis, however, indicates that this is not the case. Rather, in each declining district the enrollment elasticity is negative for at least three personnel categories. Moreover, a total of 53 (68 percent) negative enrollment elasticities are observed within the 11 declining school districts, indicating that in the majority of cases *personnel are added during decline*. Thus, consistent with the third hypothesis, the cross-sectional design results for declining school districts do not give the same results as a within-organization analysis. Rather, the cross-sectional results are generally opposite in direction and magnitude of enrollment elasticity to those found within organizations. Similar results are also obtained in the mixed districts. Therefore, with respect to mixed and declining districts, the cross-sectional results are incorrect indicators of what obtains within the respective districts.

The fourth hypothesis also is supported by the data in Table 2. If, as Freeman and Hannan (1975) indicate, declining school districts remove personnel at a slower rate than growing districts add them, then the form of the relationship in growing and declining districts should be the same (positive) but the magnitudes different. As is seen in Table 2, this is not the case. Declining districts tend to add rather than remove personnel.

The longitudinal results in Table 2 also indicate that both the type of personnel added and the rate of addition differ depending on whether the district is growing or declining. In growing districts, noninstructional personnel, professionals, and noninstructional secretaries and clerks tend to have the greatest rate of increase, whereas instructional secretaries and clerks and noninstructional administrators have the least. In declining districts that add personnel, noninstructional administrators, instructional secretaries and clerks, and noninstructional personnel have the greatest rate of increase, whereas instructional administrators and teachers have the least. Moreover, the rate at which noninstructional administrators, noninstructional personnel, instructional secretaries and clerks, and professionals are added is greater in declining districts than in growing districts. Where personnel are removed in declining districts, the rate of removal tends to be less than the rate of addition in growing districts.

A comparison of the within growing and declining district analyses suggests that as an individual organization grows and then declines, it will continue to add personnel or to remove them at a slower rate than they were added during growth. In order to test this possibility, however, it is necessary to identify organizations experiencing a prolonged period of decline after a prolonged period of growth. Over the 10 years considered in this study, 2 school districts exhibited such growth patterns. The first, district 2, grew for the first 5 years and then declined for the next 5, whereas the second district, 16, grew for 4 years and then declined for 6.

An analysis of each of these two districts (Table 3) during their respective periods of growth and decline does not indicate a consistent pattern except that personnel tend to be added during decline. In district 2, some personnel are added or removed faster during decline than growth, and others are added or removed at a slower rate. The tendency, however, is to add personnel. On the other hand, in district 16, all personnel are added or removed during decline at a slower rate than during growth.

TABLE 3
Enrollment Elasticity Within Districts 2 and 16
During Periods of Growth and Decline

	NIADM	*IADM*	*PROF*	*T*	*ISC*	*NISC*	*NIP*
District 2							
Growth	4.95	.47	.53	1.24	.25	.97	4.24
Decline	4.24	–5.35	–6.58	– 79	–4.73	11.59	–1.35
District 16							
Growth	13.29	3.85	5.57	1.88	3.08	–2.02	11.64
Decline	– .66	– .55	– .27	.37	.38	– .76	– .36

DISCUSSION

Consistent with Kimberly's (1976a) arguments regarding longitudinal research, the results of this study indicate that the inference of within-organization processes from the results of cross-sectional design results are problematic. Only in the case of the growing school districts in this study would such an inference have been appropriate (even then there was one exception), and then only with regard to the direction of the relationship, not the magnitude. In the case of declining and mixed school districts, inferences from the cross-sectional results would have been incorrect with respect to both direction and magnitude in the overwhelming majority of cases.

These results also indicate that different measures of size do have a differential impact on the administrative component. As discussed previously, although both instructional and noninstructional administrators are most responsive to changes in the number of schools, instructional administrators tend to be more responsive to changes in personnel available, and noninstructional administrators tend to be more responsive to input/output activity. However, because both administrative components were influenced by each measure of size, it cannot be argued that administrators are involved in only one problem associated with size (e.g., issues of control). Rather, they must be viewed as being involved in various issues associated with each aspect of size identified by Kimberly (1976b). Therefore, future research should focus on that measure of size that is most likely to correspond to the administrative issue of concern.

The results of this study also show, contrary to the findings of Freeman and Hannan (1975) and Hannan and Freeman (1978), that personnel tend to be added during decline, not removed. Moreover, some personnel tend to be added at a faster rate in declining districts than they are added in growing districts. This increase in personnel during decline is similar to the relationship evidenced in Tsouderos's (1955) data. In declining districts where personnel were removed, however, the rate of removal was slower than the rate at which they were added in growing districts. This slower rate of removal is consistent with the conclusions of Freeman and Hannan (1975) and Hannan and Freeman (1978). It is not clear from this study, however, why the differences in growth patterns among the personnel components exist.

The results obtained here also suggest a refinement to the conclusions of Hannan and Freeman regarding the politics of growth and decline. As a result of their study, they concluded that

> when enrollments are growing, the administrative staff appears to get only the remainder of the resource pie. However, when enrollments are declining, administration shifts to a more controlling position. . .(1978, p. 189).

The within-district results (Table 2) obtained here suggest that this relationship is true only for noninstructional administrators because their rate of increase is the least in growing districts and the greatest in declining districts. This assumes that changes in the component indicate power of control as suggested by Hannan and Freeman (1978).

The significance of the difference between the cross-sectional and longitudinal design results becomes more apparent when it is realized that regardless of which growth category (growing, declining, mixed) is considered, essentially the same cross-sectional results are observed (Table 2). Thus, a researcher naive to the growth history of the organizations comprising his/her sample would be likely to draw the same conclusions—size and personnel components are positively related. The longitudinal results, however, indicate that this is likely to be the case only in the growing category. Considering that growth histories have not been considered in previous cross-sectional studies, there is considerable reason for concern as to the validity of those findings when applied to individual organization processes. That cross-sectional results have been repeatedly replicated should not be viewed as an indicator of their validity. Indeed, if replicability is an indicator of validity, then the cross-sectional results obtained here should be viewed as valid—they were replicated in three subsamples.

That personnel are added during decline raises some questions for current theory. Some current perspectives on organization structure regard size as the single major correlate of structure, for example, Hickson, Pugh, and Pheysey, (1969). It thus is curious that reductions in size (as measured by enrollments) do not result in corresponding reductions in personnel components, particularly administrative components. In this respect, the results obtained here suggest that factors other than size contribute to the size of personnel components. Freeman (1979) suggests that sources of funds are an important factor influencing personnel components. These funds, particularly of a federal nature, generally require considerable record keeping and report filing and provide explicitly for some types of personnel. Moreover, because these funds are not necessarily related to enrollments, the need for personnel could increase during enrollment decline. In this regard, the availability of slack resources would influence the size of various personnel components. Because revenues did increase in each of the declining districts in this study and because these revenues did not greatly influence the administrative personnel (Table 1), these revenues may have been used to hire other personnel during decline. Given the differences in the rate of change in nonadministrative personnel in growing and declining districts, however, the revenue explanation indicates that revenues are used differently during growth and decline or that different revenues (e.g., different federal programs) are involved. Which of these possibilities, if either, is correct remains a subject for subsequent research.

Although the results obtained here support the hypotheses posited, there are several limitations that should be considered. First, because school districts are more directly in the political arena than are many other organizations, the results obtained here may not obtain in those other settings. Second, only one aspect of structure (personnel components) was considered here. Other dimensions of structure may not behave in a similar fashion. Third, an aggregate measure of enrollment was used. That is, no distinction was made between secondary and elementary enrollment changes and corresponding changes in personnel components. The reason for this is that data available did not break personnel components down according to type of school systems. Nevertheless, it is possible that one type of school would be declining (e.g., elementary), whereas another type may be growing, and that this difference may have influenced the results. Finally, multiple regression would have been preferred to simple regression. Unfortunately, the finite number of data points for each district made the use of such multivariate techniques problematic.

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Organizational Structure, Work Process, and Proposal Making in Administrative Bureaucracies[1]

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This paper examines the effect of organizational structures and processes on the reported proposals of innovation by middle and lower echelon officials in 44 Belgian bureaucracies. Technical and administrative innovations were examined. It was found that the determinants of proposal making differ, depending on the actor's level in the organization.

Bureaucratic organizations are often cast as static entities incapable of change in their mode of operations. In contemporary society, however, organizations are faced with continual contingencies that make change critical to survival. Efforts to study this problem have resulted in a growing body of comparative organizational research devoted to discovering those characteristics of organizations that promote innovations in inputs, internal structures and procedures, and outputs (Hage & Aiken, 1967; Mohr, 1969; Hage & Dewar, 1973; Baldridge & Burnham, 1975; Moch & Morse, 1977; Daft, 1978; Blau & McKinley, 1979). In broad terms, the dominant theme of this literature is that complex and organic forms of organization are more innovative than are simple and mechanistic ones (Pierce & Delbecq, 1977).

Recent critiques of this literature (Zaltman, Duncan, & Holbek, 1973; Rowe & Boise, 1974; Downs & Mohr, 1976; Pierce & Delbecq, 1977) raise

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a number of issues. One area of controversy has to do with the appropriate definition of innovation. For some, the term is limited to the "first or early use of an idea by one of a set of organizations with similar goals" (Becker & Whisler, 1967, p. 463). From this perspective, change is a broader, more inclusive concept that refers simply to the introduction of something new into the focal organization. This distinction, based on the argument that early and late adopters face differential risks and search costs, is, however, not accepted by all. Pierce and Delbecq, for example, define innovation in terms of newness to the focal organization arguing that "the process of incorporating something new within any given organization can represent a strategic effort for that organization, regardless of whether other industries or organizations have already proceeded through that process" (1977, p. 28).

The relative merits of these positions appear to be contingent on the nature of the organizations studied. Early research on innovation (Burns & Stalker, 1961; Mansfield, 1963) examined the activities of private sector industrial firms. Their relatively narrow goals and clear identification with particular industries enable such organizations to locate appropriate comparison organizations whose innovations they may cheaply imitate. Thus, for such firms the distinction between innovation and change seems reasonable. The more recent comparative organizational research, by contrast, has been based largely on data from nonprofit or public organizations, especially in the health and educational fields. The more diffuse goals, performance standards, and "markets" of such organizations make the identification of appropriate comparison organizations and consequently changes through relatively cheap imitations quite difficult. For these organizations, the equation by Pierce and Delbecq (1977) of innovation and change appears to have considerable merit.

The present study examines the thesis that complex and organic forms of organization promote innovation within the context of administrative bureaucracies of local governments. Because of the highly complex and diffuse goals of these organizations the Pierce-Delbecq position and use of the terms innovation and change interchangeably are followed. From Becker and Whisler's perspective, however, the focus here is on change in the focal organization. Specifically, investigation was made of the influences of complex organizational structures and organic work processes on proposals for innovation by officials performing different functions and located at different levels in the administrative hierarchy. As such, the present study departs from recent comparative work which may be faulted for failing to (a) examine the proposal phase of the innovation process, (b) distinguish between structural and process constraints on innovation, (c) explore differences in innovative activity among personnel situated at different levels in the organizational hierarchy, and (d) investigate innovation in sufficiently diverse settings.

Organizational innovation often has been conceptualized as a process consisting of a number of relatively distinct phases (Wilson, 1966; Thompson, 1965; Hage & Aiken, 1970; Zaltman et al., 1973) that involve the proposal for change and its later adoption and implementation. Despite this conceptualization of organizational innovation as a multiphase process, comparative organizational research has concentrated on the adoption phase with little attention to the proposal phase that precedes it. In these adoption studies, innovation is viewed as an outcome of some particular organizational configuration with explanations typically based on assumptions about the intervening but unobserved proposal phase of the process. That is, investigators assume that the observed impact of certain organizational characteristics on adoption is due, at least in part, to their effects on proposals. For example, it is often suggested that structural complexity increases the rate of adoption of innovations because it increases the rate at which proposals for change are made (Pierce & Delbecq, 1977).

The failure to examine the proposal phase of the innovation process in a direct and systematic manner is a serious problem. There are both empirical and theoretical reasons for believing that this process is more complex than previous research suggests. As Downs and Mohr (1976) indicate, there is much instability in the findings of the innovation literature. For example, structural complexity has been found to increase (Moch & Morse, 1977), decrease (Blau & McKinley, 1979), and not affect (Daft & Becker, 1978) innovation. Such divergent findings suggest the need for increased attention to the innovation process as a whole. In this regard, it has been argued that complex and organic forms of organization promote proposals for change but may hinder the adoption and implementation of any one of these. In brief, such conditions are held to stimulate proposals by promoting a critical and continuing examination of organizational operations by members with diverse skills and interests. Such diversity, however, may impede the adoption of innovations by increasing the problems of obtaining integration or collaboration among the specialists. From this perspective, the divergent findings regarding the impact of complexity on adoption may be explained by differing degrees of integration. That is, complexity increases proposals for change but adoptions occur only when sufficient integrative mechanisms are available to foster some degree of collaboration (Zaltman et al., 1973). However, the meager research on this general argument provides mixed support (Sapolsky, 1967; Daft & Becker, 1978).

The neglect of the process of innovation has been accompanied by an inadequate treatment of intra-organizational processes affecting the nature and degree of innovative activities. Comparative organizational studies in general (Child, 1972; Bacharach, 1978; Bacharach & Lawler, 1980) as well as those specifically devoted to innovation, have been criticized for the frequent use of a "deterministic structural model" (Pierce & Delbecq, 1977). In the innovation studies, such an approach has led not only to a preoccupation with the impact of such variables as size and structural complexity, but also to the frequent treatment of certain process characteristics as structural attributes.

Organizational structures refer to those objective properties of organizations per se that cannot be reduced to or deduced from properties of the organization's members (Bacharach & Aiken, 1976, 1977, 1979). These include size, horizontal and vertical differentiation, and role specialization. In broad terms, an organization's structural characteristics may be placed on a continuum from small and simple to large and complex. Organizational processes, by contrast, refer to the patterns of activity characterizing the members of organizations and include task, interaction, and influence activities. Processes may be placed on an organic-mechanistic continuum with nonroutine task activities, high rates of interaction and dispersed influence taken as indicative of organic processes and their opposites as connoting mechanistic ones. Processes differ from structures in that the former typically vary among organizational members differentially situated in the organization's structure.

The failure to distinguish between structures and processes and the consequent treatment of the latter as properties of the organization per se has resulted, methodologically, in the common practice of computing organizational scores for such process variables as influence, formalization, communication, boundary spanning, and task uncertainty. Such scores, derived either from reports by key informants, usually high ranking officials, or by averaging the reports by samples of organizational members, obscure the variability among organizational members on these dimensions. As a consequence, such practices often may produce highly misleading empirical results (Bacharach, 1978). Similarly, they retard the development of adequate theories of innovation by ignoring the differential importance of complex structures and organic work processes for the innovative activities of members differentially situated in the organizational structure.

The failures to focus on proposals for innovation as well as their adoption and to distinguish between structural and process determinants are closely related to a third problem: the failure to analyze differences in the innovative activities of groups differentially located in the organizational hierarchy of authority. As Parsons's (1960) distinction between the institutional, managerial, and technical levels implies, there often are qualitative differences between levels in terms of functions, constraints, and opportunities that serve to promote differences in the activities and interests of organizational members. Such vertical differences and the integration problems they pose may have more consequences for innovation in public sector organizations than the horizontal differentiation among technical specialists (Daft & Becker, 1978).

Although most studies of innovation continue to be conducted at the organizational level of analysis (Blau & McKinley, 1979), several recent efforts have attempted to assess the differing impact on innovation by organizational members or groups with varying degrees of power and/or authority (Mohr, 1969; Hage & Dewar, 1973; Daft, 1978). Such studies, although valuable and provocative, suffer from at least two deficiencies. First, the classification of members into subgroups is rather crude, with elites and nonelites the most common distinction made. Second, and presumably for pragmatic reasons, the range of independent variables examined for their effects on the innovation activities of the selected subgroups has been quite limited.

The final problem with the comparative research on innovation is that the studies are based largely on data from organizations in the health and education fields. Such a restricted empirical base obviously raises the issue of the generalizability of the findings to other types of organizations. Health and educational organizations are rather distinctive in combining highly professional components at the lower levels with at least formally superior administrative groups. Such arrangements may clearly limit the ability to generalize. For example, the frequent finding that decentralization is related to innovation may stem from the concentration of technical expertise among lower level personnel in the organizations studied. Similarly, recent arguments regarding the specialization of lower and higher level personnel in technical and administrative changes, respectively, may be valid only in organizations with very distinct professional and administrative components (Moch & Morse, 1977; Daft, 1978).

PROPOSALS FOR INNOVATIONS

The present paper explores the impact of complex organizational structures and organic work processes on proposals for innovation by administrative officials of local governments. More specifically, the focus is on proposals for technical and administrative innovations by officials at the lower and middle echelons of administrative bureaucracies. Before a discussion of specific hypotheses, it may prove helpful to describe the Belgian context in which this study was conducted. Local governments in Belgium enjoy a considerable amount of autonomy; they provide a wide range of services for their constituents (Dupriez, 1920; Reed, 1924). Government is by a mayor, several aldermen, and a city council that is elected through a system of proportional representation every six years. The city council varies in size depending on the population of the city. From among its members, the city council elects by majority vote, several aldermen who, together with the mayor, have executive authority over the administrative bureaucracy. The mayor is nominated by the council, but is officially appointed by the king. In practice, however, the appointment of the nominee of the council is virtually automatic. The executive committee of the mayor and aldermen has executive responsibility for the city administration. Day-to-day supervision is carried out by a municipal administrator who is selected by the city council but whose nomination, suspension, and dismissal must be approved by higher levels of government (Humes & Martin, 1969).

Within the organizational structure of these administrative bureaucracies, the municipal administrator is considered to be part of the upper echelon. He is responsible for the coordination and, in some cases, the supervision of the departments that comprise the administrative bureaucracy of the local government. A department is an administrative unit which provides one or more services and whose head may be responsible to the mayor, an alderman, the administrator, or a combination of these. The middle echelon department heads are responsible for translating policies devised by the upper echelon officials into effective service delivery programs. In this process they perform vertical coordination functions between the lower operational levels and the policy making or institutional level in an attempt to achieve consistency between policy demands and departmental capabilities. In addition, within their departments, the department heads are responsible for coordinating the activities of lower echelon officials who specialize, to varying degrees, in the supervision of various programs or program components. Finally, they are expected to represent their departments in organization-wide coordination activities designed to obtain consistency between the programs of various departments. Thus, in broad terms, the middle echelon officials perform a variety of vertical and horizontal coordination functions. Their lower echelon subordinates directly supervise ongoing service delivery operations.

The general hypothesis to be examined is that proposal making is greater in organizations with complex structures and organic processes than in those with simple structures and mechanistic processes. For present purposes structural complexity is indicated by higher levels of role specialization, horizontal differentiation, and vertical differentiation. The first hypothesis then is:

H1: The greater the structural complexity of the organization, the greater the reported proposals for innovations.

Structural complexity is expected to promote more proposals for several reasons. First, high levels of complexity indicate diverse bases of expertise which result in (a) the identification of a wide range of problems and (b) the availability of diverse kinds of information and perspectives regarding problem solving innovations (Zaltman et al., 1973). Second, complexity also implies a diversity of interests which stimulates proposals for innovation as the various occupational groups, departments, and strata seek to enhance or protect their position vis-á-vis competitors (Wilson, 1966). Third, structural complexity makes possible, and may often require, the formal or informal assignment of special responsibilities for proposing organizational changes to particular roles and subunits. Thus, for example, increasing vertical differentiation into a multitiered hierarchy may lead to changes in the roles of some administrative personnel as they are encouraged or required to delegate some operational responsibilities and concern themselves with broader issues (Blau & Schoenherr, 1971). Fourth, complexity increases coordination and control problems. Such problems, in turn, may lead to a continuing search for solutions and proposals for innovation. As indicated earlier, evidence in support of the complexity-innovation relation is mixed when dealing with either proposals (Sapolsky, 1967; Daft & Becker, 1978) or adoption (Moch & Morse, 1977; Blau & McKinley, 1979).

The next set of hypotheses refers to the effects of organic work processes on proposals for innovation. These processes differ from organizational structures in that they typically vary among organizational members occupying different positions in the structure. The first of these concerns task activities.

H2: The less routine the task activities of organizational members, the greater the reported proposals for innovation.

Nonroutine tasks are expected to increase proposals for innovation because they present individuals with ambiguous work situations in which organizational guidelines and controls often are lacking. As a result, individuals often conceive of and propose task changes to meet better the task requirements and their own needs. Moreover, the unique expertise developed in coping with the special demands of uncertain tasks often constitutes a source of ideas for more extensive organizational changes. Despite the centrality of task uncertainty in theories of organizations, there are no studies that directly assess the relation of this variable with innovation. Typically, uncertainty is inferred from high levels of role specialization and/or professionalism.

The next two hypotheses focus on the probable consequences of certain patterns of interaction on proposals for innovation:

H3: The greater the extent of boundary spanning activities by organizational members, the greater the reported proposals for innovation.

Organizational members whose tasks require that they maintain greater contacts with outside groups to perform their functions are expected to propose more innovations because such contacts serve as conduits for information about both organizational problems and innovative problem-solutions. Although there is little research directly bearing on this hypothesis, there is substantial literature indicating the importance of external information sources in the innovation process (Tushman, 1977).

H4: The greater the rate of internal verbal communication by organizational members, the greater the reported proposals for innovation.

Higher rates of internal verbal communication may promote proposals for reasons analogous to those above. That is, extensive verbal communication facilitates the rapid diffusion of information throughout the organization (Bacharach & Aiken, 1977) about performance gaps and promotes a cross-fertilization of ideas about possible solutions. In addition, such communication may promote proposals by enabling potential proposers to locate supporters more easily and thus develop a political base for the proposal. Although there are clear theoretical supports for the role of internal verbal communication in the innovation process (Thompson, 1965; Hage & Aiken, 1970; Zaltman et al., 1973), the empirical evidence is surprisingly scant, although supportive (Aiken & Hage, 1971).

The dispersion of power in an organization also is expected to increase proposals for innovation:

H5: The greater the dispersion of influence among organizational members, the greater the reported proposals for innovation.

Because of their proximity to operations, middle and lower echelon personnel in organizations often are acutely aware of problems and have ideas for desirable changes. Moreover, their subordinate status in the hierarchy may provide them with incentives to propose innovations that will better their position. However, such personnel may actually propose innovations only when they perceive that their influence is sufficient to ensure that their proposals receive a fair and thorough hearing. Evidence from previous studies of both proposals and adoption supports the position that dispersed influence increases innovation (Moch, 1976).

The next hypothesis argues, in effect, that structural complexity has a differential impact on the proposal-making activities of middle and lower echelon officials of administrative bureaucracies.

H6: Structural complexity increases proposals for innovations by the middle echelon department heads more than those of the lower echelon officials.

Structural complexity is expected to have a differential effect on the proposal making activities of these two strata because their functions differ substantially. As indicated, the middle echelon department heads function primarily as coordinators. Their lower echelon subordinates are responsible for the direct supervision of operations. Complexity, by increasing the coordination and control problems of officials, may stimulate increasing proposals for change to deal with these difficulties. Because department heads are primarily responsible for coordination, most of these problem solving proposals should emanate from this stratum. For example, increasing role specialization among lower echelon officials increases the coördination and integration problems confronting department heads. Increasing vertical differentiation has a similar effect as the distance between the upper echelon policy makers and actual operations increases. Similarly, increasing horizontal differentiation makes external coordination more problematic as the number of other specialized departments increases.

However, the various dimensions of complexity not only pose coordination problems for department heads but also provide them with certain opportunities for proposal making which their subordinate officials usually lack. First, both role specialization and horizontal differentiation are expected to increase proposals for change by increasing the diversity of knowledge bases and interests within the organization. As Daft and Becker (1978) point out, this argument assumes some degree of contact and communication among specialized individuals and subunits with divergent perspectives. Within departments, contacts among the lower echelon supervisors with varying degrees of specialization are often indirect and channeled through their common superior—the department head. As a result, increasing role specialization provides department heads, but not necessarily their subordinates, with diverse information and perspectives and thus facilitates their problem solving abilities. Similarly, the role of department heads as representatives of their departments in interdepartmental coordination activities provides this stratum with far more information regarding the activities and interests of the other departments than is available to the lower echelon officials. Consequently, the increasing diversity stemming from increasing horizontal differentiation promotes the proposal making of department heads more than that of their subordinates. Finally, increasing vertical differentiation through the addition of organizational levels often requires some degree of delegation of administrative responsibilities to the lower echelon officials. Such delegation buffers or insulates, to some degree, the heads of departments from day-to-day activities and enables them to concentrate their energies on analyses of departmental problems and the formulation of proposals for innovation.

A final hypothesis stems from the likelihood that somewhat different processes underlie proposals for technical and administrative innovations. In this regard, it can be argued that technical change is a bottom up process initiated and supported by lower level personnel with expertise in the technical core activities of the organization. By contrast, administrative innovations lie within the domain of the higher level, administrative personnel and thus proceed from the top down (Moch & Morse, 1977; Daft, 1978). Within the context of the present study, the implications of this perspective are twofold. The first concerns differences in the extent of proposals by personnel at different levels in the hierarchy. Specifically, it suggests that lower echelon officials are more active in proposing technical innovations than are their middle echelon superiors, and the latter are more active in proposing administrative changes. Such differences are unlikely in administrative bureaucracies which, unlike schools and hospitals, do not contain distinct professional components. Although performing different functions, both the middle and lower echelon officials are nonetheless administrative personnel with interests that do not sharply diverge along technical and administrative lines. As a result, it is to be expected that the middle echelon officials are more active than their subordinates in proposing both kinds of innovations. A second implication is that, for both lower and middle echelon personnel, influence increases proposals for technical innovations more than proposals for administrative ones. This is quite plausible for two reasons. First, both groups of officials do have knowledge of operating problems by virtue of their present or past supervisory experiences. Influence is presumably an important consideration in their decisions to translate such knowledge into actual proposals for technical innovations. Second, although differing in status, both groups occupy subordinate positions in the organizational hierarchy. As a result, proposals for administrative innovations may stem, at least in some cases, from a perceived lack of sufficient influence to perform effectively. As a result, the relation of influence with administrative proposals may be positive but relatively low.

H7: Influence is more positively related to proposals for technical innovations than to proposals for administrative ones.

It should be noted that although this paper focuses on the internal structures and processes of these organizations, it does not intend to imply that these organizations exist in a vacuum. Rather, they exist in a larger task environment—both proximate and more distant. The proximate task environment is the local city for which these administrative bureaucracies coordinate, control, and deliver a range of basic social services. The size of these administrative bureaucracies depends to a large extent on the size of the city in which they are located and the extent to which the city is an employment and specialized service center (Aiken & Bacharach, 1978). Further, the personnel of these administrative bureaucracies are linked to persons in a variety of other governmental, professional, and economic organizations both inside and outside the boundaries of the local community. This paper focuses only on a set of internal structures and processes in these bureaucracies, but there is no intention to imply that the larger context of these organizations has no impact on innovative processes, but rather that they are beyond the scope of this paper (Aiken & Bacharach, 1979).

METHODS

The data used in this study were gathered in 44 administrative bureaucracies in Belgian cities having a population size of 15,000 to 100,000 as of December 31, 1968. These cities were selected on the basis of a 50 percent stratified random sample of the 16 cities in the Brussels agglomeration, 25 cities in Wallonia, and 55 cities in Flanders in that size range on that date. Of the 49 cities in the original sample, four in Flanders and one in Wallonia were excluded either because of lack of cooperation by city officials or because of an unacceptably low response rate by members of the administrative bureaucracy.

In each city the mayor and municipal administrator were interviewed, and a sample of members of the administrative bureaucracy was given a questionnaire. All department heads (that is, middle echelons) were automatically selected in the sample. Within each department, a simple random sample of other members (lower echelons) was selected. The sampling ratio varied according to the size of the department as follows: in departments with less than 10 administrative staff, one-half were selected; in departments with 10 to 19 administrative staff members, one-third were selected; in departments with 20 or more administrative staff members, one-fourth were selected. Only administrative personnel were included in the study. Workers, police, and fire-fighting personnel were excluded.

Of the 1,005 questionnaires distributed in these 44 bureaucracies, 85.9 percent were returned, and approximately 82 percent were usable. The response rate was 73 percent or higher for each city included in the study, and there was no difference in the response rate of middle and lower echelon respondents.

Dependent Variables

The dependent variables in this study are proposals for:
(a) technical innovations by middle echelon personnel
(b) administrative innovations by middle echelon personnel
(c) technical innovations by lower echelon personnel
(d) administrative innovations by lower echelon personnel.
For each of these variables, two related but nonetheless distinct indicators are used: (a) the percent of respondents in a particular echelon proposing the innovation in question, and (b) the average number of proposals for the particular innovation by these respondents. These percents and averages were calculated from individual responses to questionnaire items. For technical innovations, respondents were asked:

1. We would like to know about your attempts to change or modify the activities and administrative practices in your service: In the last ten years, have you ever made propositions or have you participated in the elaboration of formal propositions to change the *technical equipment* in this township administration, regardless of whether or not these propositions were accepted by your managers and whether or not they were put into practice? (No = 0, Yes = 1).

2. Would you briefly describe each of these propositions in Column A below?

The percent of officials proposing innovations was calculated from responses to the first question. A count of the number of proposals described in response to the second furnished the data for calculating the average number of proposals. It should be noted that having respondents describe each of their proposals constitutes a check on the validity of these self-reports.

Similar questions were asked regarding proposals of administrative innovations:

1. During the past ten years, have you made any propositions or have you participated in the elaboration of any formal propositions to your superior concerning changes in or modification in *management methods*, including *techniques of leadership* and other *management techniques*, regardless of whether these propositions were accepted or not by your management and whether or not they were put into practice? (No = 0, Yes = 1).

2. Would you briefly describe each of these propositions in Column A below?

As before, averages of the number of innovations proposed were based on a count of the proposals described.

TABLE 1
Means and Standard Deviations of the Dependent Variables
($N = 44$)

	Middle Echelon			*Lower Echelon*		
Dependent Variables	*Mean*	*S.D.*	*Range*	*Mean*	*S.D.*	*Range*
Percent proposing technical innovations	66.50	26.00	0-100	26.80	13.20	0-50
Average number of technical proposals	1.49	.79	0-4.5	.52	.32	0-1.33
Percent proposing administrative innovations	27.30	24.30	0-100	12.00	13.30	0-50
Average number of administrative innovations	.53	.58	0-2.25	.19	.21	0-.63

The means, standard deviations and ranges of the dependent variables are shown in Table 1. Mean scores were computed separately for the middle and lower echelons of each organization by summing individual scores and dividing by the number of respondents.

The respondents were questioned regarding proposals made over the last 10 years rather than a shorter time period because field observation and pretesting indicated that these administrative bureaucracies were slow to introduce innovations. Thus, to study innovative activities in such organizations, it was necessary to lengthen the time span examined. The data in Table 1 confirm preliminary observations regarding the rate of innovation in these organizations. Despite the extended time period, the extent of proposal making activities remains quite low.

Several issues need to be addressed regarding these measures. The first concerns the validity of the self-reports. As indicated, requiring respondents to describe each proposal for innovation provides a check on the validity of their responses. Had respondents simply been asked for the number of proposals made rather than a description of each, the validity problem would have been rather serious. A second issue concerns the possibility that the data are confounded by differences among the organizations sampled in the average tenure or years of employment of their middle and lower echelon officials. Such differences may stem from both differential rates of turnover and internal mobility. To the extent that proposals for innovations among these officials are a function of their years of employment, differences in average years of employment among the sampled organizations could systematically bias the data and empirical analyses. To deal with these problems, the regression analyses control department head's years in office and lower echelon officials' years with the organization.

The third problem has to do with the direction of causation. This, of course, stems from the measurement of proposals over a 10-year period, while the independent variables were measured at the end of this period. This issue of causation is an ever-present one in cross-sectional studies and is particularly severe in the comparative work on innovation. In much of this research, the dependent variable is the number of new technologies adopted since they became available (Downs & Mohr, 1976). Daft (1978), for example, examined the adoption of innovative teaching technologies that had become available up to eight years prior to his study. Similarly, Hage and Aiken (1967) focused on program adoptions and Blau and McKinley (1979) on awards for innovative architectural designs that occurred over a 5-year period prior to their research. In these cases, innovation was taken as the cumulative sum of events for a period of time with the measurement of the independent variables occurring at the end of the period.

Such measurement practices raise the possibility that the relations observed between innovation and the independent variables are due, at least in part, to the influence of the former on the latter. In this present study, this problem may be less serious than is often the case. First, as will be shown, the data in the sample indicate that proposals for innovation are relatively insensitive to the time that officials have occupied their positions. Second, the focus is on proposals for innovation—whether successful or not—rather than actual innovations. The probability of the latter affecting the organizational structures and internal processes would appear greater than proposals per se. Third, it is reasonable to assume that the organizational structures and work processes of administrative bureaucracies tend to be relatively more stable over time than those of the organizations usually examined in the adoption studies.

A final issue concerns the question of studying organizational innovation through an examination of such activities in administrative bureaucracies which are, admittedly, slow to innovate. First, as argued earlier, the development of an adequate theory or theories of innovation requires that research be conducted on diverse types of organizations. To date, comparative studies have been largely concentrated on organizations in the health and educational fields. Second, the activities of local government organizations are becoming increasingly important for the delivery of social services and as sources of employment. Studies of the determinants of innovative activities (and thus the lack thereof) among these organizations may yield important implications for public policies.

Independent Variables

(a) Structural Variables—Organizational size was measured by the number of staff members in the local administrative bureaucracy. Even though the range of city size in the sample was restricted to cities having a population between 15,000 and 100,000, the size of these administrative bureaucracies varied between 44 and 1,530. The average size was 245.7, with a standard deviation of 271.4. This variable was found to be quite skewed so it was transformed into its natural logarithm prior to statistical analysis.

Horizontal differentiation was measured by the number of departments in the organization. A department was defined as any unit having at least two persons and two levels, the head of which reported to the mayor, the administrator, and/or an alderman. The range was from 3 to 12 departments with a mean of 7.16 and a standard deviation of 2.22.

Vertical differentiation was measured by the number of levels in each department from the department head to the lowest level worker and then calculating the average for all departments. Organizational scores ranged from 2.50 to 6, the mean was 3.64, and the standard deviation was .87.

The measure of role specialization used here was developed by Pugh, Hickson, Hinings, and Turner (1969). It reflects the number of specialized roles across 16 functional areas. Organizational scores varied between 0 and 21, the mean was 9.1 and the standard deviation was 5.1.

(b) Process Variables—Four indicators of work processes were used. Scores were first constructed for each respondent with mean scores then computed separately for middle and lower echelons of each organization.

The degree of task routinization was based on responses to the following questionnaire items:

1. There is something different to do here every day.
2. People here do the same job in the same way every day (reversed).
3. In my bureau we need to learn more than one job.
4. The same steps must be followed in processing every piece of work (reversed).
5. For almost every job there is something new happening almost every day.
6. Would you say your work here is very routine (coded at 4); routine (coded at 3); nonroutine (coded at 2); or very nonroutine (coded at 1)?

Items 1, 3, and 5 were coded from "1" indicating strong agreement to "4" indicating strong disagreement. For items 2 and 4 the coding was reversed with item 6 coded as indicated. Respondents' scores were calculated by adding their responses and dividing by 6—the number of items. Cronbach's alpha, a measure of reliability, is .70 for middle echelon routinization and .73 for lower echelon routinization.

To operationalize boundary spanning, each respondent was asked to report separately the number of contacts with persons during a typical week in other organizations in the public sector and the number of contacts with persons in other organizations but outside the public sector during a typical week. These were summed for each person, and then level-specific boundary spanning scores were constructed by calculating the average for all department heads and the average for all subordinates in each organization. Cronbach's alpha is .78 for the middle echelon and .55 for the lower echelon.

In this study, a series of questions were asked about communication in the organization. Respondents were asked to report separately the number of contacts either in face-to-face meetings or by telephone with persons at the same level, at a lower level, and a higher level in the organization in a typical week. For each respondent the number of such contacts was added with level-specific averages then computed for middle echelon department heads and lower echelon officials in each organization.

Influence in work decisions was measured on the basis of responses to five questionnaire items regarding perceived influence over several facets of the work environment. Specifically, the respondents were asked to assess their influence in decisions regarding (a) training programs and methods used in their department; (b) the allocation of work among available personnel, (c) the evaluation of work performance, (d) work assignments, and (e) work methods. Response categories were: none = 1, a little = 2, some = 3, and quite a bit = 4. The average response for each respondent was computed and then level-specific averages were calculated. The alpha coefficient of this scale was .90 for middle echelon officials and .87 for lower echelon ones.

Level Specific Differences

The descriptive statistics of the dependent (see Table 1) and independent variables (see Table 2) indicate that there are marked differences between the middle and lower echelon officials. In terms of proposals for innovation, the former are far more prone than the latter to make proposals for not only administrative innovations, but also for technical ones. For example, about two-thirds of the department heads proposed at least one technical innovation, but less than one-third of their subordinates engaged in this kind of activity. There is, however, considerable variation in regard to the rates of proposals among the organizations studied as reflected by the standard deviations and the ranges of the four measures for each echelon.

The data in Table 2 also indicate differences between echelons with department heads reporting, on the average, less routinized task activities, greater influence in work decisions, more internal communication, and higher levels of boundary spanning activity than lower echelon officials. Such differences may, of course, contribute to the differences in rates of proposals. However, for present purposes, the significance of these differences as well as those pertaining to proposals is that they provide an additional reason for examining the hypotheses of this study separately for middle and lower echelon officials. What thus remains is to examine whether the structural and process variables affect the proposal making activities of these officials in the same way.

TABLE 2

Means and Standard Deviations of Process Variables

	Middle Echelon				*Lower Echelon*			
	Mean	*S.D.*	*High*	*Low*	*Mean*	*S.D.*	*High*	*Low*
Task routinization	1.87	.26	2.71	1.33	2.17	.23	2.65	1.57
Internal communication	9.60	7.28	36.00	.58	6.55	3.31	19.99	.33
Boundary spanning	4.89	4.40	17.50	.25	4.05	2.74	14.06	.00
Influence in work decisions	3.20	.56	4.00	1.77	1.98	.36	2.62	1.00

TABLE 3
Pearson Correlations of Proposal-Making with Independent Variables
($N = 44$)

	Middle Echelon				*Lower Echelon*			
	Percent Making Proposals		*Average # Proposals*		*Percent Making Proposals*		*Average # Proposals*	
	Technical	*Administrative*	*Technical*	*Administrative*	*Technical*	*Administrative*	*Technical*	*Administrative*
Structural complexity								
Role specialization	.151	.085	.173	.067	.175	.092	.169	.061
Horizontal differentiation	-.220	-.150	-.216	-.004	-.318*	-.227	-.272*	-.147
Vertical differentiation	.477***	.393**	.501***	.460***	.119	.136	.143	.115
Work processes								
Task routinization	-.015	-.278*	.034	-.174	-.210	-.375**	-.321*	-.387**
Internal communication	.274*	.464***	.299*	.413**	.285*	.216	.327*	.144
Boundary spanning	.078	.234	-.005	.282*	.540***	.576***	.454***	.519***
Influence	.230	.321*	.314*	.378**	.489***	.406**	.523***	.427**
Control variables								
Size	.148	-.004	.223	.156	.045	.070	.063	.061
Tenure of officials[a]	.029	-.149	-.038	.015	.236	.435**	.114	.268*

[a] This variable was operationalized by years in position for the middle echelon (mean = 9.83; S.D. = 5.16) and by years in the organization for the lower echelon (mean = 14.75; S.D. = 3.66).

*$p \leq .05$

**$p \leq .01$

***$p \leq .001$

FINDINGS

In Table 3 are shown the correlations of the independent variables with proposals for innovation by middle and lower echelon officials. There are some consistencies in this data regardless of the measure of proposals, echelon, and type of innovation. First, and contrary to the hypotheses, neither role specialization nor horizontal differentiation—two indicators of complexity—is positively related to proposals. The relations are generally nonsignificant although horizontal differentiation appears to decrease proposals for technical innovations among the lower echelon officials. Second, and consistent with the hypotheses, both influence and internal verbal communication tend to increase proposal making activities. Third, one of the control variables, organizational size, is consistently unrelated to proposals for innovations. Although no hypothesis was advanced, size was examined because of its frequent link in the literature with both innovation and a number of the independent variables, most notably, structural complexity.

As anticipated, there is some evidence of differences in the processes underlying the proposal-making activities of the middle and lower echelon officials. First, vertical differentiation does have a differential effect on proposals by these two echelons. The number of levels in the hierarchy increases proposals by middle echelon officials while not affecting those of the lower echelon personnel. Second, and by contrast, lower echelon proposals increase with their boundary spanning activities and to a lesser degree with their years of employment within the organization while decreasing with the routinization of their task activities. None of these variables consistently affects the proposals by middle echelon officials. Although differences by echelon are much in evidence, there are no apparent differences in the determinants of technical and administrative innovations that hold for both echelons.

To determine the separate effects of the independent variables on proposals for innovation, multiple regression analyses were carried out. Only those variables that were significantly correlated with proposal making at the .05 level or better were entered in the regression equations. In Table 4 the standardized beta coefficients obtained in the multiple regression analyses are displayed. With regard to the middle echelon (part A of the table), vertical differentiation emerges as the strongest and most consistent predictor of proposals for innovation. For each of the four innovation variables, the standardized beta coefficients are relatively large and statistically significant. In organizations with tall hierarchies the department heads are more likely to make proposals for innovation. Internal verbal communication also is consistently a predictor of middle echelon proposals, although the betas, for the most part, are lower than for vertical differentiation. The more department heads communicate with subordinates, superiors, and fellow department heads, the more they make proposals for innovation.

TABLE 4
Multiple Regressions of Proposal-Making on Independent Variables for Middle and Lower Echelons[a]
($N=44$)

	Percent Making Proposals		*Average Number of Proposals*	
	Technical	*Administrative*	*Technical*	*Administrative*
A. *Middle echelon*				
Vertical differentiation	.454***	.357**	.490***	.427***
Influence		-.029	-.030	.041
Internal communication	.226*	.392***	.257*	.272*
Boundary spanning				.202
Task routinization		-.150		
R^2	.278	.355	.313	.381
B. *Lower echelon*				
Horizontal differentiation	-.213*		-.184	
Influence	.341**	.151	.397***	.210
Boundary spanning	.394**	.408***	.212	.361**
Internal communication	-.043		.081	
Task routinization		-.137	-.033	-.179
Tenure of officials		.273**		.097
R^2	.435	.467	.391	.372

[a] All are standardized regression coefficients. The blank spaces indicate that because the zero-order correlation was nonsignificant at the .05 level, the variable was not included in the regression equation.

*$p \leq .10$
**$p \leq .05$
***$p \leq .01$

Very different predictors of proposals for innovatino among lower echelon officials are evident in part B of Table 4. Boundary spanning is the most consistant predictor of lower echelon proposals (three of the four standardized beta coefficients are statistically significant). Influence also emerges as an important predictor of proposals for technical innovations but not of administrative ones for the lower echelon. Hence, for the lower echelon, proposals for innovation are associated with greater contacts outside the organization and, for technical innovations, greater influence inside the organization.

In summary, the correlational and regression analyses indicate: (a) There are no relations between complex structures and organic processes on the one hand and proposals for innovation on the other that are consistently positive regardless of the measure of proposal making, the organizational echelon observed, or the type of innovation examined. The only consistencies observed were nonsignificant. (b) The particular organizational features predictive of proposals for innovation differ by organizational level. Vertical differentiation and internal communication are positive predictors of proposals for innovation at the middle echelon but have little effect at the lower echelon. Conversely, proposals for innovation at the lower organizational level are positively predicted by the extent of boundary spanning and influence, but these variables have little effect on proposals for innovation at the middle echelon. (c) None of the features of complex and organic organizations were found to be differentially predictive of types of proposals for innovation at both the middle and lower echelons. However, at the lower echelon, some degree of differential predictability was apparent as influence was a positive predictor of technical proposals but had little effect on proposals for administrative innovations.

DISCUSSION AND CONCLUSION

This research has examined the effects of complex organizational structures and organic work processes on proposals for innovations by middle and lower echelon officials of administrative bureaucracies. The most striking finding of this study is that such structures and processes do not affect proposals by these officials in the same way. Differences in hierarchical location and function result in different processes underlying proposal making activities by middle and lower echelon personnel.

For the former, who perform essentially coordination functions, vertical differentiation was the strongest predictor of their proposals. Increases in vertical differentiation increase the coordination problems of department heads as additional organizational levels separate both these officials and the upper echelon policy makers from the actual service delivery operations. Such separation increases the department heads' difficulties of coordinating and controlling the activities of the lower echelon personnel. More importantly, under such circumstances there is an increase in the problems of coordinating the resources and operations of their departments with the demands of increasingly isolated policy makers. These coordination problems create needs for department heads to propose problem solving innovations. At the same time, the increasing distance from operational activities and the consequent pressure to delegate some responsibilities may provide these officials with the necessary time to formulate adequate proposals.

In addition, the middle echelon rate of internal verbal communication also emerged as a consistent and positive predictor of their rate of proposals. Such activities evidently provide information to these officials about problems and possible solutions. That these informational bases for proposals are internal to the organization is consistent with the department heads' internal coordination functions.

By contrast, the lower echelon officials' proposals for innovations appear to be based on informational sources outside the organization. This is suggested by the finding that their boundary spanning activity is the most consistent and positive predictor of their rate of proposals. These contacts with elements of the task environment provide these officials with information about both problems in the service delivery operations of their departments and innovations of possible use in dealing with them. In addition, such contacts may increase the power of these officials to the extent that their boundary spanning activities are seen by their superiors as important for coping with environmental uncertainties (Spekman, 1979). Given their low position in the administrative hierarchy, these officials may need an external power base from which to propose innovations because such proposals may, at times, be perceived as threatening by their superiors (Kelley, 1976).

That power considerations are especially salient for lower echelon officials is suggested by the finding that perceived influence increases their rate of proposals. No such effects are apparent among the middle echelon officials. The effects of lower echelon influence are particularly strong on proposals for technical innovations. The modest, although positive, impact of influence on proposals for administrative innovations suggests that such proposals sometimes stem from a perceived lack of influence on the part of lower echelon officials with the proposed changes designed to increase their influence.

These findings, in conjunction with the descriptive data presented in Tables 1 and 2, suggest that the frequent lack of responsiveness of local government organizations to the changing needs of their service clientele stems from two sources. First, the lower echelon officials, who are better situated structurally both to understand client problems and to propose desirable changes, are often constrained by a lack of informational and power resources. Their relatively low levels of boundary spanning activity and perceived influence over their work lead these supervisors of the service delivery operations to propose far fewer innovations than their middle echelon superiors. Second, attempts by the latter to initiate both technical and administrative changes appear to be responses to internal coordination difficulties rather than service delivery problems. Vertical differentiation increases the difficulties of obtaining compatibility between upper echelon policies and lower level operations. Proposals for innovations to deal with these coordination problems are based on internal rather than external information sources.

To return to the themes raised at the onset of this paper, the proposal phase of the innovation process was found to be more complex than much of the literature implies. Contrary to expectations, a number of variables thought to promote proposals, such as role specialization and nonroutine tasks, had little effect. Others, most notably vertical differentiation and boundary spanning, had effects that differed, depending on the members' locations in the hierarchy. Given these findings, a first and obvious implication of this research is the need for further investigation of this proposal phase. Such work is needed to provide a basis for the development of better theories of the innovation process as a whole.

The present study also suggests the utility of distinguishing between organizational structures and processes. Such a distinction implies research conducted at multiple levels of analysis. This approach proved to have merit in the present study as different determinants of proposals of innovations were evident for groups differently situated in the organizational hierarchy of authority. An extension of this mode of analysis to examine the proposal making activities of upper echelon policy makers and lower level operatives, as well as service clientele and political groups, would appear to represent an important next step for research. Complementing this need for an expanded focus is the need for systematic attention to the relations among the various internal and external groups with interests in the nature and pace of innovation. In the present study, for example, no examination was made of the consequences of attributes and activities of the lower echelon for the middle echelon rate of proposals or of the effects of characteristics of the latter on proposals by the former. Such a focus on intergroup relations and cross-level effects may provide important insights regarding the process of proposal making.

A final implication of the present study is the need for innovation studies to be conducted in more diverse organizational settings than has been the practice in the past. Such efforts are necessary in order to develop more powerful, if only middle range, theories of innovation.

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Effects of Ownership and Performance on Executive Tenure in U.S. Corporations[1]

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The relationship between executive tenure and selected company characteristics was examined for 84 U.S. corporations. Among other findings, performance measures were related to the tenure of the chief executive depending on the concentration of stock ownership. Tenure was unrelated to performance for owner managed firms, was related positively to profit margins for externally controlled firms, and was related positively to stock market rates of return for management controlled firms.

The study of managerial succession has a substantial history in the research literature on formal organizations. An early focus concerned the effect of bureaucratization, usually represented by size, on the frequency of succession (Grusky, 1961). Subsequent attention focused on the consequences of inside or outside succession (Helmich & Brown, 1972; Helmich, 1974; Carlson, 1961). More organizational change was associated with outside succession, and a progression of insiders slowed organizational growth (Helmich, 1974) and adaptation (Carlson, 1961). A third theme addressed how the occurrence and rate of succession affected organizational performance (Grusky, 1963; Eitzen & Yetman, 1972; Lieberson & O'Connor, 1972).

The argument that succession may promote organizational change relates to attempts to link tenure with executive performance. Common sense would suggest that when an organization is performing poorly, replacement of the manager might be expected. This effect might arise either

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because the manager is made a scapegoat (Gamson & Scotch, 1964) or because changes in executive positions are necessary to shift long-standing organizational policies. When the demands or constraints on an organization change and its decisions do not, poor performance may result. It may then be necessary to recruit persons who are neither associated with the past nor committed to inappropriate strategies and policies.

An implicit assumption of the argument that performance affects tenure is that interests inside or outside an organization are willing and able to change its executive when performance suffers. Correspondingly, the incumbent must lack sufficient power to avert replacement. It is clear that this condition would not always hold, and a more developed approach to the performance-tenure issue requires considering conditions under which power can be mustered to support or oppose an administrator.

The present study examines two conditions that might affect the control an incumbent executive has over the organization—the distribution of ownership and the proportion of inside directors on the board. Specifically, the relationship between performance, ownership, board of director composition, and tenure of the chief executive is examined for a random sample of U.S. corporations. The data appear to indicate that ownership directly relates to tenure and also mediates the relationship between tenure and firm performance.

BACKGROUND AND HYPOTHESES

The relationship between performance and executive tenure has not been examined frequently. But the existing evidence suggests a positive association. Executives of organizations that perform well enjoy longer tenures than do executives of poorly performing organizations. McEachern (1975) found that chief executives were more likely to change when the firms' profits declined four or more years in a row. Pfeffer and Leblebici (1973) observed that the tenures of chief executives were negatively related to their organizations' debt to equity ratio, a measure of financial risk. Grusky (1963) found the turnover of baseball managers to rise with declining team performance. Salancik, Staw, and Pondy (1978) observed that the turnover of academic department heads was greater when resources were scarce or more difficult to acquire. And Pfeffer and Salancik (1977) found chief hospital administrators to have shorter terms within hospitals that faced greater competition for funding and staff.

An even more limited empirical and theoretical history addresses the effect of ownership on administrative tenure. Pfeffer and Salancik (1978) argued that power may become institutionalized in organizations to such an extent that subunit influence within the firm is unaffected by the environmental contingencies confronting the firm. In a study of hospital administrators, they found that the characteristics of newly appointed administrators more closely matched the contingencies facing the organization, suggesting a lag between changing environmental conditions and changing control in organizations (Pfeffer & Salancik, 1977). These authors also found that tenure was associated with the ownership of the hospital. Terms of office were longer in private, nonprofit hospitals and shorter in hospitals affiliated with religious denominations.

McEachern (1975) provided additional evidence about the effects of ownership on chief executive officer tenure in two samples of U.S. corporations. He classified the firms as: (1) owner managed, those for which stock ownership was concentrated among its managers; (2) management controlled, for which stock ownership was dispersed among many shareholders; and (3) externally controlled, for which stock ownership was concentrated among a few individuals who did not manage the firm. McEachern reported that the chief executives of owner-managed firms had tenures thrice those of executives of other firms.

Although not discussed by McEachern, his three ownership classes differ in ways that could affect executive turnover indirectly by interacting with organizational performance. Ownership represents a source of power that can be used either to support or oppose management, depending on how it is concentrated and used. In general, the more concentrated ownership is the more potent potential support or opposition. This derives from the more general theorem of Emerson (1962) and Blau (1964) that power is a function of exchanges and the availability of alternative sources of exchange. Concentrations of ownership reduce the available alternative sources for ownership support. When such is the case, it becomes an important question as to how the concentrated power is aligned with a firm's management and what contingencies encourage support. For an owner-managed firm, potential support would be high because concentrated ownership is aligned with management; however, the potential to concentrate opposition would be low, because it must be recruited from fewer and more dispersed nonmanaging stockholders. By contrast, when stock ownership is concentrated in the hands of outsiders, as for McEachern's externally controlled firms, owners can either support or oppose current management. One suspects that which becomes the case will depend on the firm's performance under the executive's stewardship. When observable performance declines, tenures will be shorter. For a management controlled firm, a still different condition exists: stock ownership is diffused and limits the ability to muster either opposition or support from owners. However, because ownership interests are commonly organized by management through proxy votes, a bias in the short term will exist in support of management, permitting the managers more discretion in such firms. Thus, such firms are similar to owner managed firms, although the parallel is not exact. With diffuse ownership, stock may become concentrated in the hands of outsiders, as in takeovers, or when otherwise quiescent shareholders are stimulated to act against management through a proxy fight. One thus could surmise that managers of such firms are somewhat insulated from ownership demands save when such demands threaten to become concentrated to oppose them.

Thus, the conditions of power and control in the three types of firms lead to predictions for differing relationships between performance and executive tenure. Among owner managed firms, where managers are most insulated from opposition, one would predict a null or even a slightly negative relationship between performance and tenure. A negative relationship would obtain if changes in management are adaptive and taken when a firm's performance declines so that subsequent performance improves, other things being equal. A firm that consistently retains a manager regardless of performance will have a lower performance on the average than a firm that changes administrators when performance declines. Thus, in a sample of firms in which some change administrators when performance declines and others do not, an overall negative relationship between performance and tenure would be observed.

In management controlled firms, opposition to the current management is organized with difficulty, primarily through unfriendly mergers, takeover attempts, or proxy fights. Thus, a null relationship between operating performance and tenure would be predicted. It is only in the case of externally controlled firms that the conditions exist for effectively holding managers accountable for the firms' performance. For firms of this type a positive correlation between performance and tenure would be observed, with longer tenure being associated with more effective firm performance.

From the above reasoning, then the first hypothesis is:

> *Hypothesis 1: Ownership and performance interact to affect executive tenure. Tenure will be most positively related to performance in the case of externally controlled firms, and least positively related in the case of owner managed firms.*

Neither McEachern (1975) nor Pfeffer and Salancik (1977) tested this interaction hypothesis, although both reported significant effects for ownership. The interaction argument is that poor performance will threaten management tenures depending upon ownership conditions that foster management control.

There is another line of argument that would lead to the same hypothesized interaction. It is possible to argue that managers with more substantial ownership positions in the firm will be motivated to stay on longer when performance is poor, in contrast to managers without such a stake in the firm. Managers in either management controlled or externally controlled firms, without as much ownership interest, may be more easily attracted away from poor performing firms or may leave voluntarily to find an environment in which they can be more successful. In owner managed firms, the managers are more committed to the firm because of their ownership interest and may be motivated to stay on to try to turn the firms' performance around. The present data do not permit a distinction between this motivational explanation and the political explanation for the interaction developed above.

Another aspect of management control is the composition of the board of directors, particularly the proportion of managers (or insiders) on the board. The proportion of inside directors is usually thought to reflect management domination of the board. Therefore, one might hypothesize:

Hypothesis 2: The higher the proportion of inside directors, the longer the tenure of the chief executive officer.

This hypothesis recognizes that, in addition to ownership, the composition of the board may be a mechanism by which control is maintained. If such were the case, one would expect to see a main effect of board composition on executive tenure, similar to the main effect for ownership observed by McEachern. And, following the argument used about ownership, one also would expect an interaction between the proportion of inside directors and performance:

Hypothesis 3: The higher the proportion of inside directors, the less tenure will be affected by poor firm performance.

Although primary interest here is in the relationship between tenure and performance and factors that may moderate the relationship, turnover frequently has been examined as a function of organizational size. The results of such research have been mixed. Grusky (1961) reported that turnover was positively related to size, but Gordon and Becker (1964) disputed his conclusions, and Pfeffer and Leblebici (1973) failed to find a significant association between firm size and executive tenure. The effect of size is examined in the analysis here to avoid misattributing any observed performance effects.

DATA AND SAMPLE

The data base for this analysis was collected for a large sample drawn by McEachern (1975) for his study of control, executive compensation, and firm performance. The sample was drawn randomly from *Forbes Five Hundreds* in 1972 and stratified to insure 32 firms of each ownership class. Because of the unavailability of some data collected for McEachern's sample, only 84 of his 96 firms were studied.

Control type was classified by McEachern (1975). A firm was classified as externally controlled if a group or individual held 4 percent or more of the common stock and was not part of the firm's management. A firm was classified as owner managed if the chief executive owned, directly or through immediate family, 4 percent or more of the stock. A firm was management controlled when no single group or individual owned 4 percent or more of the stock.

The exact amount of stock needed to control effectively a firm is unknown, as is the precise functional relationship between ownership concentration and control. The function is likely to be a step function, in that ownership of more than, for instance, 51 percent of the stock will not result in more control than ownership of just 51 percent. Moreover, the tendency for share ownership to become dispersed among larger numbers of investors has reduced the amount of stock necessary for control to substantially less than 51 percent. Larner (1970) set 10 percent or greater share ownership as sufficient for control. Sorenson (1974) specified 20 percent. Within the extensive literature on control, these percentages have varied with historical changes in corporate organization, with the proportion of stock needed to control a firm decreasing since 1920 as share ownership has become more dispersed.

McEachern (1975), in the most recent and most comprehensive examination of the ownership and control issue, argued that effective control for the firms in his sample was achieved with 4 percent ownership of the stock. The results of his analysis of the performance of firms and executive compensation as a function of ownership indicate that this assumption is empirically meaningful. In the present analysis, McEachern's assumption that ownership categories were distinguishable at this level of share ownership was accepted. If this assumption were not correct, then the results hypothesized by both the present authors and by McEachern would not be observed.

Various economic theories predict differences in the effects of performance on executive compensation and in risk and rate of return characteristics according to the ownership classification of the firm. McEachern's study, in which such effects were observed as predicted, provides validation that the categorization at 4 percent share ownership is basically correct. If theory predicts differences depending on ownership classification, and a classification is found that is consistent with the theory, then there is reasonable assurance that the categorization has some validity. In the present case, McEachern's categorization of firms, validated in one research context, was used to explore a different set of hypotheses that rely on the same classifications.

Executive tenure, taken from McEachern, was the years spent as chief executive as of December 1972. Firm size was measured as assets for 1970. The proportion of insiders on the board was the proportion of directors who were managers in 1972. (An implicit assumption in employing executive tenure as a measure of management control and power in the firm is that the chief executive desires to be retained. Although there is some evidence that this is true, in that managers remain for longer periods when they have the ability to retain their positions because of ownership interests in the firm, violations of this assumption would have little effect on the analysis. If managers leave office to move to better positions, or if they leave because of death or retirement, such conditions should not vary by ownership and thus could only serve to attenuate the relationships hypothesized through the introduction of random error in the data.)

Two measures of firm performance were analyzed, operating performance and performance in the capital market. Capital market performance was estimated by McEachern as the combined rate of return on common stock for the period 1963 through 1972, considering all dividends as being reinvested in the stock of the firm throughout the period. Combined rates of return assess a firm's performance through valuations in the capital market, and they varied considerably with variations in share price appreciation during the period 1963-1972.

A second measure of firm performance was the firms' net income as a percentage of sales (profit margin) for the period 1965-1973. The data were taken from reports in *Value Line Investment Survey*. Further, using *Value Line*'s information on industry, a ratio of the firm's profit margin compared to the profit margin average for the industry during the period was constructed. Profit margin is an indicator of the operating performance of firms and was used, for example, by Lieberson and O'Connor (1972) in their study of the effects of administrative change on company outcomes. A third measure of profit margins was computed for those firms that changed executives during the period, namely, the margin prior to the administrative change.

RESULTS

Table 1 displays the simple correlations of executive tenure with size, performance, and ownership categories. For all 84 firms, executive tenure was not associated with either firm size, measured by assets, or the proportion of inside directors.

Tenure was related only slightly to performance and quite strongly to ownership. Total returns on common stock was unrelated to tenure. But company profit margins were related marginally ($r = .15$; $p < .10$, one-tail test). Profit margins of firms prior to an administrator change were unrelated.

Although profit performance and return were not strongly related to executive tenure for the full sample of 84 firms, ownership was. Executive terms averaged 16 years for owner-managed firms, 5.41 years for externally controlled firms, and 4.89 years for management-controlled firms.

To examine the hypothesized interaction between ownership and performance, two forms of analyses were employed. In the first, the correlations of the independent variables were examined separately for the three ownership categories. In the second, multiple regression analysis was

TABLE 1
Correlations Between Executive Tenure and Performance, Ownership, and Other Variables
($N = 84$)

Variable	*Correlation*
Proportion of inside directors on the board	.002
Total return on common stock, 1963-1972	.078
Total assets, 1970	.020
Average firm profit margin compared to industry, 1965-1973	.146*
Average firm profit margin, 1965-1973	.147*
Average firm profit margin compared to industry for years prior to administrative change	-.042
Owner managed classification	.604**
Management controlled classification	-.316**

*$p < .10$
**$p < .005$

employed with interaction terms in the regression to examine the interaction effect while controlling for the main effects of ownership and performance on tenure.

Table 2 presents the first analysis, the correlates of executive tenure within each ownership class. The data indicate that poorer performance least affects tenure in the case of owner managed firms and most affects it in the case of externally controlled firms.

TABLE 2
Correlations of Executive Tenure with Other Variables for Three Ownership Classes

Variable	*Owner-Managed (N=28)*	*Management Controlled (N=27)*	*Externally Controlled (N=29)*	*Statistical Significance of Difference Among Correlations*
Proportion of inside directors on board	.006	-.015	-.244	n.s.
Assets, 1970	.157	-.336*	.031	$p<.05$
Average firm profit margin, compared to industry, 1965-1973	-.181	-.153	.413**	$p<.05$
Average firm profit margin, 1965-1973	-.168	-.098	.428**	$p<.05$
Average firm profit margin, compared to industry for years prior to administrative change	-.356*	-.247	.208	$p<.10$
Total return on common stock, 1963-1972	-.145	.376*	-.069	$p<.05$

*Significantly different from zero, with a probability of .10.
**Significantly different from zero, with a probability of .05.

Profit margins correlated positively with tenure only in the case of the externally controlled firms. Profits were unrelated to tenure in the case of management controlled firms and slightly negatively related in the case of owner managed firms. On the other hand, the rate of return on common stock was related positively to tenure among management controlled firms but not the others.

The data suggest that executive retention is correlated with operating profit performance in the case of externally controlled firms, with stock price share appreciation for management controlled firms, and with neither performance measure for owner managed firms. Although this interaction between the type of performance measure and ownership was not anticipated, in retrospect it is quite compatible with the general framework of the study. Because management opposition for management controlled firms is organized through capital markets, it is appropriate that tenure for the executives of these firms is related to the firms' performance in capital markets, measured by the combined rate of return on investment.

Hypothesis 3 posited an interaction between performance and the proportion of inside directors on tenure. To examine this, interaction terms were computed by multiplying the proportion of inside directors by measures of profit margin. The correlation between tenure and these interaction terms is −.155 for firm profit margins and −.146 for profit margins relative to industry averages. The correlations are opposite those for each variable separately and indicate that when more insiders are on a board, the general positive relationship between tenure and performance is reversed. This is as predicted by Hypothesis 3, although the correlations are only marginally significant ($p < .10$).

Another way of examining the effect of performance, ownership, and the interaction of the two on tenure is to estimate multiple regression equations for these variables. Below are presented three regressions using the three indicators of performance as assessed by profit margin or net income compared to sales:

$$T = 8.74 + \underset{(1.87)}{11.60}\,OM - \underset{(2.06)}{.490}\,MC + \underset{(4.54)}{.366}\,PMI - \underset{(10.24)}{21.87}\,PMI \times OM - \underset{(12.12)}{16.16}\,PMI \times MC \qquad r^2 = .40$$

$$T = 8.73 + \underset{(1.85)}{11.43}\,OM - \underset{(2.11)}{.404}\,MC - \underset{(25.79)}{.958}\,PM - \underset{(49.88)}{104.29}\,PM \times OM - \underset{(69.62)}{70.68}\,PM \times MC \qquad r^2 = .40$$

$$T = 8.84 + \underset{(1.78)}{11.55}\,OM - \underset{(1.95)}{.868}\,MC - \underset{(3.54)}{3.14}\,PAC - \underset{(7.59)}{16.18}\,PAC \times OM - \underset{(9.98)}{9.99}\,PAC \times MC \qquad r^2 = .43$$

where T is the tenure of the executive, the number of years served by 1972, OM is a 0-1 dummy variable for owner managed firms, MC is a 0-1 dummy variable for management controlled firms, PMI is the firms' profit margin compared to the industry for 1965-1973, PM is the firms' average profit margin for 1965-1973, and PAC is the profit margin before any administrative change that occurred during that period. The last two variables in each equation are the interaction terms for the two ownership variables and the particular profit margin variable. The numbers in parentheses are the standard errors of the respective regression coefficients.

The results are consistent in all three regressions. In each case, the profit margin variable is not significant but the dummy variable for owner managed firms and its respective interaction term are. The regression results, consistent with the data in Table 2, indicate that tenure is least positively affected by profit margins in owner managed firms and most positively affected in externally controlled firms.

DISCUSSION

It is clear that ownership mediates the relationship between executive tenure and corporate performance. Tenure was related positively to profit margins in the case of externally controlled firms and to total return in the case of management controlled firms. It was slightly negatively related to each measure of performance in the case of owner managed firms.

The data seem to imply that the capital markets impose a discipline on management controlled firms in that tenure is related to the firm's share price performance in the markets. In the case of externally controlled firms, owners apparently impose discipline on managers such that tenure varies according to the profit margin performance of the firm. In the case of owner managed firms, in which power is most institutionalized, there is no evidence for a positive relationship between performance and executive tenure, and some evidence for a negative relationship. This implies little discipline over the performance of managers in such firms.

It also is clear that there is not a simple relationship between the composition of the board of directors and executive tenure. The proportion of inside directors was not directly related to tenure. This may result partly because board composition also is used to coopt and manage external interdependencies (Pfeffer, 1972). At the same time, the small interaction between performance and the proportion of inside directors suggests that performance may have a smaller effect on tenure when the proportion of inside directors is higher. Thus, board composition may have some effect on the maintenance of control when performance suffers.

Within the more general framework that inspired this analysis, it would seem that ownership does offer a mechanism for institutionalizing power in a firm (Pfeffer & Salancik, 1978) and alters the firm's responsiveness to external contingencies. Owner managers are virtually buffered from performance concerns, and outside owners with large holdings impose strict standards of immediate operating performance. But management controlled firms are less affected by operating profits and more affected by overall performance in capital markets.

The relation of capital market performance to tenure for management controlled firms is an important discovery, considering the dominance of these firms among large U.S. corporations. An increasing proportion of U.S. firms are characterized as being management controlled. Following a natural selection or ecological argument, one might conjecture that some feature of management controlled firms has encouraged their relative dominance. This study suggests that the conditions of adaptability and change may be one possible explanation for the increasing dominance of such firms. As contrasted with owner managed firms, management controlled firms are not characterized by control institutionalized to such an extent that performance problems fail to bring a change in management and policy. At the same time, in contrast to externally controlled firms, management controlled firms seem to respond, in terms of executive change, to share price performance rather than to profit margins. To the extent that capital markets are efficient and take into account both current and future performance prospects, the control structure of management controlled firms may be more sensitive to long run as well as short run considerations, providing some advantage over externally controlled firms in which executive tenure is more highly related to shorter term considerations.

Although ownership is an important source of control in business firms with consequences for executive tenure, ownership is not the only form of control. Rules that make large board of director majorities necessary to approve mergers or outside takeovers, rules that stagger the election of directors so that a significant outside purchaser of shares must wait several years to obtain control of the board, and rules that do not permit cumulative voting for directors are all examples of practices that may keep managers in control long after serious performance problems have appeared. (Cumulative voting permits a shareholder or group of shareholders to obtain some representation on the board by using all their votes for one director candidate. For example, if three directors are to be elected to the board, each shareholder potentially has three votes for each share owned—one for each director position being filled. In cumulative voting, these votes can be pooled so that the shareholders can cast all of their votes for a single candidate for a single position. Such a procedure clearly makes it easier for a significant minority to obtain at least one representative on the board.) An extension of the present study would involve examining the conditions under which such rules are instituted and the effect these rules have on executive tenure in the face of performance problems.

As suggested in the literature, one promising avenue for investigating organizational change and adaptation is executive succession. In this study of succession, the issue of how control is maintained and institutionalized can provide important insights into the interaction between organizational power and politics and organizational change in the face of critical contingencies.

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Relationships Among Individual, Task Design, and Leader Behavior Variables[1]

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A model predicting relationships among individual, task design, and leader behavior variables was examined for 171 employees of a large manufacturing firm. Correlational analyses revealed significant relationships among variables and facets of satisfaction, but not productivity. Cross-lagged correlational analysis also yielded some support for the model in terms of both satisfaction and productivity.

The most widely accepted contemporary perspective on task design is Hackman and Oldham's job characteristics theory (1976). Hackman and Oldham suggest that the relationships between task characteristics and organizationally relevant outcome variables are moderated by the individual's growth need strength. More specifically, they suggest that individuals with strong growth needs (i.e., needs for personal growth and development) will respond favorably to a high scope task whereas individuals with low growth need strength will respond less favorably. In a recent review of the literature, Pierce and Dunham (1976) note that empirical research has tended to support this approach to the study of task design. Increasingly, however, researchers are realizing that additional variables must be considered when attempting to explain the individual's work environment. Griffin (1979) has presented a model integrating individual, task design, and leader behavior variables into one framework. The purpose of this paper is to present the results of an empirical test of this model.

Using the job characteristics theory as a framework, Griffin (1979) suggests that four forms of individual-task congruence may exist in organizations. Individual-task congruence refers to the extent to which the growth needs of the individual match the motivational characteristics of the task

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being performed. The model describes four levels of congruence: (1) high/high congruence, when both task scope and employee growth needs are high, (2) high/low incongruence, when task scope is high and growth needs are low, (3) low/high incongruence, when task scope is low and growth need strength is high and, (4) low/low congruence, when both task scope and growth needs are low. This perspective is consistent with the conceptual framework presented by Porter, Lawler, and Hackman (1975) and the empirical approach of Staw and Oldham (1978).

It should be recognized that the congruence construct is a continuous variable, as are task scope and growth need strength, and that the "congruent" and "incongruent" labels are relative. This is especially true for the situation when both task scope and need strength are low. The classification of this situation as congruent does not necessarily imply that low growth needs and low task scope are a desirable condition. Rather, because several researchers (Oldham, Hackman, & Pearce, 1976; Wanous, 1974) have reported nonsignificant correlations between task and outcome variables for low growth need strength individuals and because most organizations will have some low scope tasks, it seems that this situation will be more congruent than will either of the two combinations labeled incongruent.

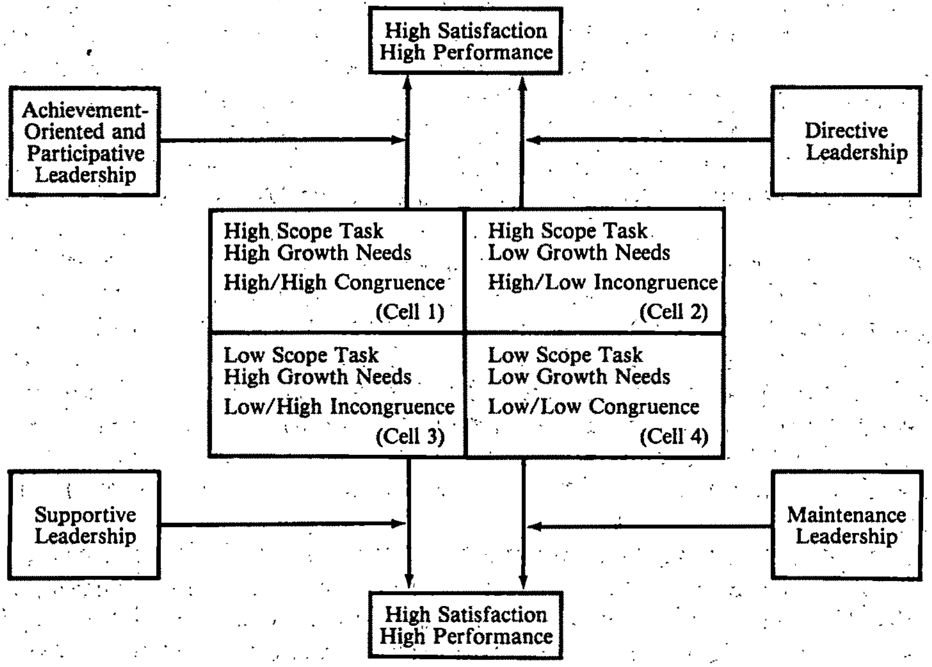
The model is predicated on the assumption that the individual-task interface is the most basic relationship within organizations (Hackman, 1977). The model assumes further that the nature of this relationship will have a direct impact on the manner in which the employee responds to other organizational factors, such as her/his leader. Hence, the model predicts that different forms of leader behavior may influence the relationships among individual-task congruence and outcome variables.

The various forms of leader behavior incorporated into the model were derived from path-goal theory (House, 1971; House & Mitchell, 1974). Path-goal theory was selected for use for two reasons. First, the theory assumes that appropriate leader behavior is contingent upon, among other things, the structure of subordinates' tasks. Second, the theory recently has received a substantial amount of research attention, with generally favorable results (Greene, 1979; Johns, 1978; Valenzi & Dessler, 1978). The basic model developed by Griffin (1979) and tested in the present research is presented in Figure 1. The rationale for predicted forms of leader behavior for each cell are summarized below.

Employees in the cell 1 situation are described as having strong growth need strength and as performing a high scope task. Based on the conceptual discussion of House and Mitchell (1974), both achievement-oriented and participative leader behaviors would appear to be appropriate for this particular employee.

The cell 2 situation is characterized by individuals performing high scope tasks and who, because of lack of motivation, may not want to cope with such an ambiguous situation by structuring their own activities. The function of the leader in this situation would appear to be to provide task

FIGURE 1
Relationships Among Task Design, Individual, and Leader Behavior Variables



structure by planning, organizing, coordinating, directing, and controlling the work of his/her subordinates. Such behavior is analogous to directive leadership. It is expected, then, that this form of behavior by the leader in the cell 2 situation would lead to favorable outcomes.

The cell 3 situation represents the situation in which employees with high growth need strength are performing low scope, simple, and routine tasks. These individuals will tend to look to their job as one source of need satisfaction, but will find these needs unfulfilled due to the nature of their task. Their reaction probably will be frustration and dissatisfaction. Strong research evidence (House & Mitchell, 1974) suggests that employees who perform this type of frustrating and dissatisfying work will tend to respond favorably to supportive leader behavior.

The situation represented by cell 4 is one in which a low growth need strength employee is performing a low scope task. Directive leader behavior probably will be inappropriate for this situation. The employee will not need the job structured. Similarly, supportive behavior also will be unnecessary because the employee is not likely to be frustrated and/or dissatisfied. Participative and achievement-oriented leader behaviors generally have been advocated when the employee is ego-involved with the task and is deriving intrinsic satisfaction from the performance of the task. These characteristics probably are not generally descriptive of the cell 4 situation; thus these forms of leader behavior also would tend to be inappropriate.

What may be appropriate, however, is a form of minimum-interference leader behavior, whereby the leader monitors performance but doesn't actively supervise the employee. Little or no interaction between the leader and subordinate would be required as long as adequate levels of performance are maintained. Hence, this form of behavior might be termed *maintenance leader behavior*. The leader in this situation may find it appropriate to maintain a low level of involvement with his/her subordinates. If performance and/or satisfaction problems arise, the leader may, however, intervene in a directive and/or supportive fashion to deal with the problem. Once the deficiency has been corrected, the supervisor reverts to maintenance leadership. This form of leader behavior appears to be conceptually appropriate for the cell 4 situation.

The specific hypotheses derived from the model and tested were as follows:

1. In the high/high congruence situation (cell 1), achievement-oriented and participative leader behaviors will be positively related to high levels of performance.

2. In the high/high congruence situation (cell 1), achievement-oriented and participative leader behaviors will be positively related to high levels of satisfaction.

3. In the high/low incongruence situation (cell 2), directive leader behavior will be positively related to high levels of performance.

4. In the high/low incongruence situation (cell 2), directive leader behavior will be positively related to high levels of satisfaction.

5. In the low/high incongruence situation (cell 3), supportive leader behavior will be positively related to high levels of performance.

6. In the low/high incongruence situation (cell 3), supportive leader behavior will be positively related to high levels of satisfaction.

7. In the low/low congruence situation (cell 4), maintenance leader behavior will be positively related to high levels of performance.

8. In the low/low congruence situation (cell 4), maintenance leader behavior will be positively related to high levels of satisfaction.

METHOD

Setting and Subjects

The research was conducted in a nonunionized manufacturing plant of one division of a large, multinational corporation. The total number of hourly workers employed by the plant was 351. Although most jobs were manual or skill-oriented, plant supervisors indicated that the jobs varied significantly in terms of required skills, complexity, and training time.

Further, employees exhibited a wide range of educational levels, age, and experience.

Procedure

The primary mode of data collection for the research was a questionnaire. The researcher gave each employee a packet of material during normal working hours. A total of 342 employees received this packet during the first administration. The packet contained a cover letter, a questionnaire, and a postage-paid envelope addressed to the researcher. Participants were asked to complete the questionnaire on their own time and return it to the researcher in the postage-paid envelope. Identification was requested, but not required. A total of 129 (37.7 percent) usable questionnaires were returned from the first administration, 109 with identification.

For a more adequate assessment of relationships among variables, and also to investigate causal-inference relationships among variables, it was necessary to collect a second round of data. In terms of leader behavior research, Greene (1974, 1975, 1979) has argued that relatively short time intervals between data collections are appropriate due to the interpersonal nature of the variables. Further, Sims and Wilkerson (1977) present evidence that selecting an interval that is too long is a more serious error than selecting an interval that is too short. For these reasons, a 90-day time interval was selected for this study.

The second administration of the questionnaire resulted in the distribution of 340 questionnaires. The method of distribution was the same as for the first, with one exception. Approximately two weeks after the questionnaires were distributed each employee received a follow-up letter from the researcher. This letter urged continued participation. A total of 171 (50.3 percent) usable questionnaires were returned from the second phase, 160 with identification. Of the 109 respondents providing identification during the first phase, 107 (97.2 percent) returned questionnaires during the second phase.

Because of the relatively low response rate, an additional study was conducted to assess possible nonresponse bias. After the second round of questionnaires had been returned, 20 respondents who had provided identification were randomly selected and interviewed. In addition, 20 individuals who had *not* returned questionnaires, or else had not identified themselves, also were randomly selected for interviews.

The interviews obtained information pertaining to two different sets of variables. Demographic and behavioral data obtained were age, number of years of formal education, percent pay raise last performance review, hourly wage rate, average productivity for week preceding interview, number of years full-time work experience, and number of days missed from working during the previous year. Affective data included one question dealing with task scope, one dealing with growth need strength, five dealing with satisfaction, and one dealing with management's concern for people versus productivity. Potential differences between respondents and nonrespondents were assessed through the use of chi-square and *t*-tests. No significant differences were found between groups on any of the variables studied.

Nonrespondents to the questionnaire also were asked why they had not participated in the study. Thirteen individuals (65 percent) indicated that they "did not have enough time." Three people (15 percent) said they "lost the questionnaire." Two employees (10 percent) said they "had no interest in the study." One person (5 percent) said he "never got the questionnaire." Finally, one employee (5 percent) indicated that he thought the study "would not improve working conditions." Hence, nonresponse bias does not appear to be a contaminating factor.

Measures

Job Characteristics—Task scope was measured by the Job Characteristics Inventory (JCI) developed by Sims, Szilagyi, and Keller (1976). Their initial validation work and recent findings by Pierce and Dunham (1978) suggest that the JCI is comparable to other perceptual measures of job characteristics in terms of its validity and reliability. Cronbach's (1951) alpha for the scale was .89 at time 1 and .96 at time 2. Factor analyses confirmed the a priori structure at both time points.

Growth Need Strength—Individual growth need strength was measured by a subscale of the Job Diagnostic Survey (JDS) developed by Hackman and Oldham (1975). This measure provides an index of strength of higher order needs relative to lower order needs. Alpha was .92 at time 1 and .97 at time 2.

Leader Behavior—Based on a review of the factor analysis results presented by House and Dessler (1974), five items to measure directive behavior, five items to measure supportive behavior, and four items to measure participative behavior were selected for inclusion in the present questionnaire. Achievement-oriented leader behavior was assessed with five items developed from the conceptual discussion by House and Mitchell (1974), and maintenance leader behavior was measured with four items designed specifically for this research; for example, "My supervisor doesn't bother me as long as I do a good job" and "My supervisor leaves me alone and lets me work." Factor analysis results supported the scale's construct validity. Cronbach's alpha ranged from a low of .74 (participative, time 1) to a high of .96 (supportive, time 2).

Satisfaction—Satisfaction was measured with a modified version of Alderfer's (1972) ERG scale. Specific facets of satisfaction included in the study were satisfaction with the job, satisfaction with supervision, and overall satisfaction. In general, factor analysis results supported the scale's construct validity. Alpha values ranged from .79 (satisfaction with job and supervision, both time 1) to .93 (satisfaction with job, time 2).

Productivity—The organization generates a daily index of productivity for each employee for whom direct labor costs can be assessed. This index reflects the employee's total output for the day, controlling for setup time, downtime, and scrappage. The index is expressed as a percentage, with 100 percent reflecting standard or desired output. The index was available for 88 of the employees who returned questionnaires during the first round (68.2 percent) and 139 of the employees responding to the second questionnaire (81.7 percent). For this study, each individual's productivity was calculated by averaging the daily indices for the 10-day period surrounding the date of questionnaire administration.

Overall, the scale reliabilities compare favorably to other reliability estimates reported in the literature. (Means and standard deviations for all variables are available from the author upon request.)

Analyses

Intercorrelations among all time 1 variables are presented in Table 1. A moderate level of intercorrelation exists among facets of leader behavior. This is not seen as a problem, however, because the leader behaviors are not conceptualized as being independent constructs (House & Mitchell, 1974). Otherwise, all variables exhibit acceptable levels of independence. The only significant differences among time 2 intercorrelations were among the facets of leader behavior. In general, the time 2 correlations were smaller than those at time 1.

The four job characteristics (variety, autonomy, feedback, and identity) were scored according to the a priori format (Sims et al., 1976). These scores, in turn, were summed to form an overall index of task scope.

TABLE 1
Correlation Matrix of Variables (Time 1)

	1.	*2.*	*3.*	*4.*	*5.*	*6.*	*7.*	*8.*	*9.*	*10.*
1. Task scope										
2. Need strength	.12									
3. Achievement LB	.09	-.05								
4. Participative LB	-.04	.10	.60***							
5. Directive LB	-.11	.09	.52***	.24**						
6. Supportive LB	.02	-.12	.41***	.59***	.16*					
7. Maintenance LB	.13	.02	.12	.09	-.07	.25**				
8. Productivity	-.07	-.09	-.03	-.04	-.09	-.01	.12			
9. Overall satisfaction	.10	-.06	-.04	.04	-.06	-.08	-.13	-.13		
10. Satisfaction with job	.43**	.12	.05	.13	.12	-.22**	-.10	-.04	.40***	
11. Satisfaction with supervisor	-.14	-.01	-.10	.12	.20*	.22**	.04	-.26**	.60***	.38***

*$p<.05$
**$p<.01$
***$p<.001$

Scores for individual growth need strength were calculated by summing the 12 items that comprise the scale. The leader behavior and job satisfaction subscales also were scored according to the a priori format.

Cell 1 of the conceptual model describes the situation in which a high growth need strength individual performs a high scope task. Individuals scoring above the sample median on task scope and above the sample median on need strength were classified as cell 1. Cell 2 represents a low growth need strength person performing a high scope task. Accordingly, respondents with need strength scores below the median and task scope scores above the median were assigned to cell 2. Similarly, cell 3 of the model pertains to high growth need strength individuals, operationalized as need strength scores above the median, and low scope tasks, operationalized as task scope scores below the median. Finally, cell 4 represents the situation in which a low growth need strength individual performs a low scope task. Individuals scoring below the sample median on both measures were classified as cell 4.

For these subgrouping procedures to be appropriate, two conditions must be met. The first is that sufficient variance exist in both task scope and growth need strength measures to insure subgroups that are qualitatively different and to guard against restriction of range problems. A comparison of standard deviations for the four task characteristics with those reported in the literature for the same and similar measures (Sims et al., 1976; Hackman & Oldham, 1975) indicated that substantial variation exists in the present sample. Similarly, the standard deviation for the growth need strength measure also exceeded those reported by Hackman and Oldham (1975).

The second necessary condition for the subgrouping procedure is that measures of task scope and growth need strength be uncorrelated. The correlation between these variables for time 1, as reported in Table 1, is .12 (ns). At time 2, this correlation is -.04 (ns). Hence the subgrouping procedure appears to be appropriate. (Moderated regression was not used because the results are more difficult to interpret and because a recent paper by Blood and Mullet [1978] has demonstrated that moderated regression techniques may fail to indicate moderating effects that are actually present.)

To test predicted relationships among variables, several techniques were utilized. Pearson product-moment correlations were used to test bivariate relationships between leader behaviors and dependent variables for each of the four cells of the model. Fisher's z-transformations then were used to assess significant differences among correlations.

Partial correlations also were used to test relationships among leader behaviors and outcome variables. Of course, the use of partial correlations for small samples is somewhat tenuous, but the extent to which partial correlation patterns are consistent with Pearson correlations should provide additional insights into predicted relationships. For cell 1 of the model, achievement-oriented and participative leader behaviors were correlated with dependent variables, with directive, supportive, and maintenance leader behaviors held constant (third order partials). For the other three cells, predicted forms of leader behavior were correlated with dependent variables, with all other forms of leader behavior controlled (fourth order partials). Fourth order partials for nonpredicted variables also were computed.

Possible causal relationships among leader behavior and outcome variables were investigated through the use of cross-lagged correlations. The cross-lagged panel correlation technique utilizes data obtained with the same instrument from the same respondents at two time points. Three sets of correlations are computed from the data: autocorrelations (correlations between the same variables across time points), synchronous or static correlations (correlations among different variables within time points), and cross-lagged correlations (correlations among different variables across time points). Inferences about possible causal relationships among pairs of variables are made by comparing the magnitude of the two cross-lagged correlations. Following the procedure outlined by Kenny (1975), correlations were corrected for possible reliability shifts and compared using the Pearson-Filon method.

These three forms of analysis related to specific relationships. An additional test was used to assess the overall usefulness of the model for predicting outcome variables. This analysis does not relate to specific relationships, but focuses on the total model. The test was based on the assumption that if task design and leader behavior variables taken together explain more variance in individual satisfaction and/or performance than just task design or leader behavior variables taken alone, then justification will have been provided for the expanded model.

For this purpose, multiple regression equations were computed using: (1) leader behavior variables to the exclusion of job design variables, (2) job design variables to the exclusion of leadership behavior variables, and (3) leader behavior and job design variables together as predictors of satisfaction and performance. In these analyses, task design variables were represented by categorical dummy variables specifying the four levels of individual-task congruence. In the equations in which both leader behavior and task design variables were taken together, each leader behavior was multiplied by the dummy variable representing the individual-task congruence cell for which the leader behavior was proposed to be appropriate. This equation therefore represented the proposed interactions between leader behavior and individual-task congruence. To the extent that the interaction model is valid, this equation should be more predictive of subordinate satisfaction and productivity than is either equation treating task design and leader behavior variables separately.

RESULTS

Correlations between predicted forms of leader behavior and outcome variables by cell for time 1 are presented in Table 2. Similar correlations

TABLE 2
Correlations Between Leader Behaviors and Outcome Variables for Time 1

Cell and Leader Behavior[a]	Productivity[b]		Overall Satisfaction		Satisfaction-Job		Satisfaction-Supervision	
	Pearson	Partial	Pearson	Partial	Pearson	Partial	Pearson	Partial
Cell 1 ($N=36$)								
Achievement	.25	.26	.54***	.25	.50***	.30*	.51***	.26
Participative	.16	.03	.49***	.29*	.46**	.33*	.63***	.47*
Directive	-.03	-.07	.47**	.18	.38*	.11	.36*	.07
Supportive	.17	.05	.37*	-.05	.28	-.12	.45**	-.01
Maintenance	.27	-.01	.42**	.03	.35*	-.05	.37*	-.09
Cell 2 ($N=30$)								
Achievement	-.01	-.27	-.13	-.01	-.15	-.13	-.21	-.37*
Participative	.05	.22	-.02	.31	-.01	.11	.05	.12
Directive	-.12	.28	.48**	.38*	.46**	.32	.30	.34*
Supportive	.16	-.15	-.39*	-.30	-.18	.09	.06	.37*
Maintenance	.33*	.44*	-.48**	.01	-.40*	-.20	-.22	-.21
Cell 3 ($N=32$)								
Achievement	.20	-.08	.19	-.12	.42**	-.15	-.11	-.06
Participative	.28	.31	.14	.28	.07	.02	.12	-.23
Directive	.25	.18	.37*	.38*	.44**	.48**	.11	.11
Supportive	.02	-.01	.48**	.55**	-.07	.01	.82***	.80***
Maintenance	-.19	-.06	-.01	.01	.12	-.30	.23	.01
Cell 4 ($N=44$)								
Achievement	.01	-.26	-.36*	-.22	-.25	-.21	-.11	-.14
Participative	.13	.18	-.29	-.18	.01	-.05	-.20	-.04
Directive	.12	.16	-.14	.24	-.16	.02	-.03	.11
Supportive	-.04	-.27	-.10	.19	.07	.13	-.08	.35*
Maintenance	-.20	-.21	.45**	.39*	-.04	-.08	.22	.51**

[a] Predicted leader behaviors and correlations for each cell are underlined.
[b] Cell sizes = 20, 22, 20, 22, respectively.
*$p<.05$
**$p<.01$
***$p<.001$

TABLE 3
Correlations Between Leader Behaviors and Outcome Variables for Time 2

Cell and Leader Behavior[a]	Productivity[b]		Overall Satisfaction		Satisfaction-Job		Satisfaction-Supervision	
	Pearson	Partial	Pearson	Partial	Pearson	Partial	Pearson	Partial
Cell 1 ($N=43$)								
Achievement	-.09	-.02	.43***	.16	.60***	.54**	.32*	.15
Participative	.09	.18	.30*	.04	.33*	-.11	.37**	.38*
Directive	-.09	-.03	.15	.34*	.07	.09	.25*	.22
Supportive	-.07	-.11	-.21	-.29*	-.39**	-.10	.02	-.16
Maintenance	.01	.16	-.28*	-.02	-.52***	-.23	-.08	.11
Cell 2 ($N=42$)								
Achievement	-.14	-.09	-.29*	-.03	-.10	-.07	-.12	-.17
Participative	-.12	-.05	-.13	.32*	-.05	.04	.05	.34*
Directive	.06	.05	.37**	-.20	.08	-.11	.53***	.42**
Supportive	.01	.11	-.46***	-.48***	.10	.10	-.25	-.02
Maintenance	-.10	.02	-.36**	-.39**	-.24	-.17	-.32*	.06
Cell 3 ($N=42$)								
Achievement	-.09	-.11	-.13	-.09	.43**	.17	-.17	.03
Participative	-.07	-.13	.03	.23	.50***	.29*	-.21	-.35*
Directive	.15	.23	-.12	-.13	.60***	.45**	-.01	.31*
Supportive	.07	.15	.72***	.65**	-.07	-.07	.87***	.85***
Maintenance	.08	.19	-.42**	-.16	-.01	-.24	-.52***	-.11
Cell 4 ($N=44$)								
Achievement	.06	.01	-.30*	.09	.29*	.31*	-.47***	-.39**
Participative	.01	-.01	-.22	-.07	.15	.28*	-.11	-.21
Directive	-.36*	-.36	-.27	-.03	-.03	-.03	-.23	-.23
Supportive	.03	.16	-.39**	-.17	-.01	-.32*	-.17	.39**
Maintenance	.12	.09	.67***	.53**	-.46***	-.35*	.74***	.63***

[a] Predicted leader behaviors and correlations for each cell are underlined.

[b] Cell sizes = 32, 37, 35, 30, respectively.

$^{*}p < .05$

$^{**}p < .01$

$^{***}p < .001$

for time 2 are presented in Table 3. No significant correlations were found between predicted forms of leader behavior and productivity. Some support, however, was found for predicted relationships involving facets of satisfaction as outcome variables. For the variable overall satisfaction, support was strongest for cells 3 and 4 at both time points. Results for cells 1 and 2, particularly the partial correlations, are less supportive, but still indicate relationships in the predicted directions.

For the outcome variable satisfaction with job, fairly strong support was found for predicted relationships for cell 1. Other predicted relationships involving satisfaction with job received no support. Predictions involving satisfaction with supervisor received support at time 1 for cells 1 and 3, and predictions for all cells were supported at time 2.

Table 4 presents the results of the z-transformations. In general, the pattern of results corresponds with the above discussion of the

TABLE 4
Significant Differences Between Pearson Correlations of Predicted Leader Behaviors and Dependent Variables and Other Leader Behaviors and Dependent Variables for Each Cell (Z Test)[a]

	Cell 1			
Dependent Variable	*Time 1*		*Time 2*	
Productivity	None		None	
Overall satisfaction	None		Ach and Sup	($p<.01$)
			Ach and Main	($p<.01$)
			Part and Sup	($p<.05$)
			Part and Main	($p<.05$)
Satisfaction with job	None		Ach and Dir	($p<.01$)
			Ach and Sup	($p<.001$)
			Ach and Main	($p<.001$)
			Part and Sup	($p<.01$)
			Part and Main	($p<.001$)
Satisfaction with supervisor	None		None	
	Cell 2			
Dependent Variable	*Time 1*		*Time 2*	
Productivity	None		None	
Overall satisfaction	Dir and Ach	($p<.01$)	Dir and Ach	($p<.01$)
	Dir and Part	($p<.01$)	Dir and Part	($p<.05$)
	Dir and Sup	($p<.001$)	Dir and Sup	($p<.001$)
	Dir and Main	($p<.001$)	Dir and Main	($p<.01$)
Satisfaction with job	Dir and Ach	($p<.05$)	None	
	Dir and Part	($p<.05$)		
	Dir and Sup	($p<.01$)		
	Dir and Main	($p<.001$)		
Satisfaction with supervisor	None		Dir and Ach	($p<.01$)
			Dir and Part	($p<.05$)
			Dir and Sup	($p<.001$)
			Dir and Main	($p<.001$)

[a] Ach (achievement-oriented leadership); Sup (supportive leadership); Main (maintenance leadership); Part (participative leadership); Dir (directive leadership).

[b] Differences in correlations significant but in opposite direction than predicted. All other differences are in the predicted direction.

TABLE 4 (cont.)
Significant Differences Between Pearson Correlations of Predicted Leader Behaviors and Dependent Variables and Other Leader Behaviors and Dependent Variables for Each Cell (Z Test)[a]

Cell 3				
Dependent Variable	*Time 1*		*Time 2*	
Productivity	None		None	
Overall satisfaction	Sup and Main	($p<.05$)	Sup and Ach	($p<.001$)
			Sup and Part	($p<.001$)
			Sup and Dir	($p<.001$)
			Sup and Main	($p<.001$)
Satisfaction with job	Sup and Ach	($p<.05$)[b]	Sup and Ach	($p<.05$)[b]
	Sup and Dir	($p<.05$)[b]	Sup and Part	($p<.05$)[b]
			Sup and Dir	($p<.01$)[b]
Satisfaction with supervisor	Sup and Ach	($p<.001$)	Sup and Ach	($p<.001$)
	Sup and Part	($p<.001$)	Sup and Part	($p<.001$)
	Sup and Dir	($p<.001$)	Sup and Dir	($p<.001$)
	Sup and Main	($p<.001$)	Sup and Main	($p<.001$)

Cell 4				
Dependent Variable	*Time 1*		*Time 2*	
Productivity	None		None	
Overall satisfaction	Main and Ach	($p<.01$)	Main and Ach	($p<.001$)
	Main and Part	($p<.01$)	Main and Part	($p<.001$)
	Main and Dir	($p<.05$)	Main and Dir	($p<.001$)
	Main and Sup	($p<.05$)	Main and Sup	($p<.001$)
Satisfaction with job	None		Main and Ach	($p<.01$)[b]
			Main and Part	($p<.05$)[b]
Satisfaction with supervisor	None		Main and Ach	($p<.001$)
			Main and Part	($p<.001$)
			Main and Dir	($p<.001$)
			Main and Sup	($p<.001$)

[a] Ach (achievement-oriented leadership); Sup (supportive leadership); Main (maintenance leadership); Part (participative leadership); Dir (directive leadership).

[b] Differences in correlations significant but in opposite direction than predicted. All other differences are in the predicted direction.

correlations. A few unexpected results were found and these also are presented in Table 4.

The results of the cross-lagged analyses are presented in Table 5. No causal inference relationships among cell 1 variables were detected. For the cell 2 data, a causal relationship between directive leader behavior and satisfaction with supervision was supported. Further, the data indicate possible reciprocal causality between directive behavior and overall satisfaction.

Reciprocal causality is also suggested for cell 3 between supportive leader behavior and overall satisfaction. Further, causality may be inferred between supportive leader behavior and satisfaction with job and satisfaction with supervision. Finally, a causal inference relationship between maintenance leader behavior and productivity was detected for cell 4. Hence, the data suggest that a leader may influence productivity only if

TABLE 5
Cross-Lag Correlations Between Leader Behaviors and Outcome Variables

Cell and Leader Behavior (x) With Dependent Variables (y)	*Corrected Cross-Lag Correlations*		*Level of Significance Between Correlations*
	$r_{x_1y_2}$	$r_{y_1x_2}$	
Cell 1			
Achievement with:			
1. Productivity	.07	−.17	n.s.
2. Overall satisfaction	−.11	−.03	n.s.
3. Satisfaction with job	−.16	−.07	n.s.
4. Satisfaction with supervision	−.21	.07	n.s.
Cell 1			
Participative with:			
1. Productivity	.18	−.16	n.s.
2. Overall satisfaction	−.19	−.20	n.s.
3. Satisfaction with job	−.21	−.23	n.s.
4. Satisfaction with supervision	−.16	−.03	n.s.
Cell 2			
Directive with:			
1. Productivity	−.02	−.11	n.s.
2. Overall satisfaction	.46**	.50***	n.s.
3. Satisfaction with job	.15	.15	n.s.
4. Satisfaction with supervision	.48***	.15	(p<.01)
Cell 3			
Supportive with:			
1. Productivity	.15	.16	n.s.
2. Overall satisfaction	.67***	.52***	n.s.
3. Satisfaction with job	.38**	.03	(p<.01)
4. Satisfaction with supervision	.89***	.74***	(p<.05)
Cell 4			
Maintenance with:			
1. Productivity	.55***	−.28*	(p<.001)
2. Overall satisfaction	.44**	.44**	n.s.
3. Satisfaction with job	−.44**	.33*	(p<.001)
4. Satisfaction with supervision	.38**	.50***	n.s.

*p<.05
**p<.01
***p<.001

he/she engages in maintenance behavior while supervising a cell 4 employee. The cell 4 data also suggest a reverse causal inference relationship between maintenance leader behavior and satisfaction with the job.

Overall, then, the data tend to support the hypotheses dealing with satisfaction, but less support is provided for the hypotheses dealing with productivity. Based on the preceding discussion, the extent to which the hypotheses were supported, partially supported, or not supported is summarized in Table 6.

The results of the test of the overall model are presented in Table 7. The expanded equation incorporating both leader behavior and task design variables is a significantly better predictor of overall satisfaction and satisfaction with supervision than either of the two simpler models utilizing just leader behavior and just task design variables. The complex equation does not, however, predict productivity or satisfaction with the job any better than do the two simpler models. It also should be noted that all

TABLE 6
Summary of Results

Hypothesis	*Cell*	*Leader Behavior*	*Dependent Variable*	*Degree of Support*
1	1	Achievement Participative	Performance	Not supported
2	1	Achievement Participative	Overall satisfaction	Partially supported
2	1	Achievement Participative	Satisfaction with job	Partially supported
2	1	Achievement Participative	Satisfaction with supervisor	Partially supported
3	2	Directive	Performance	Not supported
4	2	Directive	Overall satisfaction	Partially supported
4	2	Directive	Satisfaction with job	Partially supported
4	2	Directive	Satisfaction with supervisor	Supported
5	3	Supportive	Performance	Not supported
6	3	Supportive	Overall satisfaction	Supported
6	3	Supportive	Satisfaction with job	Partially supported
6	3	Supportive	Satisfaction with supervisor	Supported
7	4	Maintenance	Performance	Partially supported
8	4	Maintenance	Overall satisfaction	Partially supported
8	4	Maintenance	Satisfaction with job	Not supported
8	4	Maintenance	Satisfaction with supervisor	Partially supported

TABLE 7
Correlations Between Actual and Predicted Values of Dependent Variables

Dependent Variable	*As Predicted by Leader Behavior Alone*	*As Predicted by Both Leader Behavior and Task Design*	*As Predicted by Task Design Alone*
Productivity	.16*	.16*	.14*
Overall satisfaction	.16*	←→ .53*** ←→	.09
Satisfaction with job	.76***	.76***	.73***
Satisfaction with supervision	.26***	←→ .62*** ←→	.13

Note: Correlations connected by arrows (↔) are significantly different at $p<.001$.

Leader behavior equation:

$$y_1 = b_1(\text{Ach}) + b_2(\text{Par}) + b_3(\text{Dir}) + b_4(\text{Sup}) + b_5(\text{Main}) + a$$

Task design equation:

$$y_2 = b_1x_1 + b_2x_2 + b_3x_3 + a$$

where: $x_1 = 1$ if cell 1, 0 otherwise
$x_2 = 1$ if cell 2, 0 otherwise
$x_3 = 1$ if cell 3, 0 otherwise

Combined equation:

$$y_3 = x_1b_1(\text{Ach}) + x_1b_2(\text{Par}) + x_2b_3(\text{Dir}) + x_3b_4(\text{Sup}) + x_4b_5(\text{Main}) + a$$

where: $x_1 = 1$ if cell 1, 0 otherwise
$x_2 = 1$ if cell 2, 0 otherwise
$x_3 = 1$ if cell 3, 0 otherwise
$x_4 = 1$ if cell 4, 0 otherwise

*$p<.05$
**$p<.01$
***$p<.001$

three equations predicted satisfaction with job very well but none of the equations predicted productivity well.

The relatively low predictive power of all equations pertaining to productivity is consistent with the lack of support for correlational relationships discussed previously. The predictive power of the expanded equation for satisfaction with supervision and overall satisfaction provides moderate support for the expanded model, at least in terms of satisfaction as a dependent variable.

DISCUSSION

The conceptual model tested in this research predicts that task design and individual growth need strength jointly define a construct called individual-task congruence. The model further predicts that leader behavior influences the relationship between individual-task congruence and satisfaction and productivity. Facets of satisfaction predicted to be related to leader behavior are satisfaction with the job, satisfaction with supervision, and overall satisfaction.

Overall, the finding of significant correlations among various facets of satisfaction and leader behaviors serves to indicate that the primary impact of appropriate leader behavior may be on affective rather than behavioral variables. Of particular importance are the cross-lagged results pertaining to the two congruent situations versus the two incongruent situations.

The finding that predicted causal inference relationships between leader behavior(s) and satisfaction were not supported for the congruent situations (cells 1 and 4) might serve to indicate that when individual-task congruence is high, there is little the leader can and/or should do to enhance individual satisfaction. This argument is consistent with the assumption that the individual-task relationship is the most basic relationship within the organization.

On the other hand, moderate support is provided for predictions pertaining to satisfaction in incongruent situations (cells 2 and 3). These findings might serve to indicate that leader behavior may have a positive influence on employee satisfaction when the characteristics of the task and the needs of the individual are not properly matched. By exhibiting certain forms of behavior (i.e., directive or supportive), the leader may serve, at least partially, to neutralize individual-task incongruence and, in turn, increase employee satisfaction.

One prediction concerning a causal relationship between leader behavior and productivity is supported by the data. This finding relates to the cell 4 situation in which maintenance leader behavior is predicted to lead to productivity. This finding may be of particular significance in that the maintenance construct is a modification of the current path-goal theory formulation. Because the four facets of leader behavior currently described by the theory are all unrelated to productivity, but the predicted relationship between maintenance behavior and productivity is supported (for the present sample), the maintenance construct may facilitate further modifications and refinements of the theory in such a way as to explain individual performance more satisfactorily.

The lack of support for other predictions pertaining to productivity may be a result of any of three possible explanations. First, the index of productivity utilized in the study might not be a valid measure of individual productivity. The possibility exists that work scheduling procedures utilized within the company and the mechanical nature of most jobs studied do not allow individual effort and/or ability to vary productivity to any significant extent. If the individual measure of productivity used in the study does not actually reflect individual effort and/or experience, then the results obtained are not surprising.

A second explanation might be that neither task design nor leader behavior relate to productivity. The most prominent contemporary task design theorist and researcher (Hackman, 1977) suggests that although productivity *may* be related to task design variables, the primary outcome variables obtained by properly matching task characteristics and individual needs are satisfaction and motivation. However, some evidence exists (Steers & Spencer, 1977) that productivity is an appropriate outcome variable. Therefore, this particular explanation cannot be either totally accepted or rejected.

The third alternative is that task design and leader behavior are just two of many variables, including individual effort, skills, and experience, the reward and performance appraisal systems, co-worker factors, and technology, which interact to determine performance. Taken apart from these other variables, task design and/or leader behavior may not account for enough variance in productivity to reflect a significant correlation. This explanation appears more tenable than either of the other two.

The indirect test of the entire model also yielded moderate support for the integration of task and leader behavior variables. The results of this test suggested that leader behavior and task design variables taken together explain a significantly greater amount of variance in overall satisfaction and satisfaction with supervision than do either leader behavior or task design variables taken alone. Based on these results (though not all predicted relationships among variables were supported), there is some demonstrated support for the conceptual model presented in Figure 1.

IMPLICATIONS AND FUTURE DIRECTIONS

The study of the relationship between the employee and her/his task has been an important avenue of research. However, even more insights into organizational behavior may be achieved by expanding the framework within which tasks are studied. By incorporating non-task variables into task design research in a systematic fashion, the result may be increased understanding of the determinants of employee performance and satisfaction.

The results obtained in the research reported here indicate that relationships may exist among task design, individual, and leader behavior variables as they relate to satisfaction and performance. Recently, other studies have suggested relationships among task design variables and technology (Rousseau, 1977), organization structure and technology (Schuler, 1977), and organizational climate, managerial style, work assignments, and employees' perceptions of their careers (Dunham, 1977). These findings, taken together, indicate the need for further study within an expanding framework of task design.

Of course, not all of the predicted relationships among individual, task design, and leader behavior variables were supported by the results of this study. Further, the data were obtained from one organization and a great deal of reliance was placed on perceptual measures. Overall, however, the results of the study indicate the need for additional research into frameworks such as the one developed here.

A logical extension of this study would be a reformulation and refinement of the model. Two specific modifications appear warranted. First, the complex network of individual, task design, and leader behavior variables must be stated with greater precision. That is, a simplifying assumption was made that the variables act in a linear fashion to predict outcomes when, in fact, the true relationships probably are more complex. Second, the exact linkages between variable combinations and facets of satisfaction, as well as other potential outcome variables, should be more fully developed and described.

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Individuals and Information Overload in Organizations: Is More Necessarily Better?

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Hypotheses were postulated that perceived information overload would be associated with higher satisfaction and lower performance of decision makers than would perceived information underload. The results from two field studies support these hypotheses. The implication of these findings for organizational communication and decision making are discussed.

A number of authors have advocated viewing organizations as information processing systems (Galbraith, 1977; O'Reilly & Pondy, 1979; Tushman & Nadler, 1978). Galbraith (1977), for example, suggests that organizations facing varying amounts of uncertainty need to adjust their information processing capacities in order to adapt successfully to the different environments. Thus, as uncertainty increases, more information must be processed so that these firms will be organized differently from those facing a more certain task environment. Tushman and Nadler (1978) also note that different organization structures have different capacities for processing information such that organizations or subunits are likely to be more effective when there is a match between the information processing requirements of the task and the information processing capacity of the unit. Some empirical evidence is available that supports these theoretical contentions (Driver & Streufert, 1969; Duncan, 1973; O'Reilly & Roberts, 1977; Tushman, 1978).

This information processing view of organizations calls attention to the need to match information processing capabilities to the information load encountered. Failure to achieve this balance may lead to the familiar problem of *information overload* and its less familiar obverse, *information underload.* An early study of a library by Meier (1963) documented the former. As requests for service at the library increased beyond the capacity of the system to process them, the level of stress and confusion increased, and breakdowns in service occurred. Although little else in the way of empirical evidence for the impact of information overload on organizations is available, the intuitive importance of this phenomenon is often noted. Hall, for example, observes that "a communications problem that is perhaps more characteristic of organizations than other social entities is communications overload" (1977, p. 290). Katz and Kahn (1977), Downs (1967), and others also pay substantial attention to the problems of communication overload. Ackoff (1967), for example, warns of the danger of assuming that more information is always needed by managers. Kaufman (1973) suggests that rather than provide more information to executives, organizations should make better use of information already available. Clearly, at an organizational level the dangers of information overload are recognized. But what is the evidence of the impact of overload on individuals in organizations?

At the individual level, little systematic attention has been paid to the effect of overload or underload on organizational members. Several reasons for this can be offered. First, the intuitive dangers of overload seem obvious, requiring little or no empirical support for substantiation. A familiar complaint among managers and administrators is that of being "overloaded." Similarly, the dangers of "not getting the word" or receiving too little information also are intuitively obvious.

A second possible explanation for the dearth of empirical study is the lack of precision in the definition and measurement of the concepts of overload and underload. Formally, judgments of overload and underload, such as those made when evaluating electronic communications systems, are based on precise measures of: (a) the volume or load of information being received, and (b) the capacity or rate at which the system can process this information input. With individuals, however, assessments of overload and underload require more subjective appraisals, capturing not only judgments about ability to process but also preferences for rate of processing and satisfaction with the processing task. Hence, studies of overload and underload of organizational members need to capture differences in individual processing capacities, work environments, and desires for information. This suggests a need for studies of objective overload, such as those conducted in laboratories, as well as investigations of perceived or reported overload, such as those that might be done in field settings.

Although almost no research has been conducted on information overload and underload of individuals in organizational settings, there does exist a substantial amount of relevant research from laboratory studies of information and decision making. These investigations document several intriguing effects of information load on attitudes and performance. First, as expected, there is clear evidence that increased amounts of relevant information lead to better decision making performance (Blanchard, 1966; Naylor & Clark, 1968; Nystedt, 1974; Porat & Haas, 1969). Second, increased quantities of irrelevant information reduce decision makers' abilities to identify relevant information and thereby reduce decision making performance (Hodge & Reid, 1971; Streufert, 1973; Well, 1971). For instance, Manis, Fichman, and Platt (1978) provide evidence that low validity cues are used by decision makers, as suggested by information integration theory, and result in lower decision making accuracy. Troutman and Shanteau (1977) also conclude that irrelevant information or low validity cues may be used by decision makers with a corresponding decrease in decision making performance. Einhorn (1971) also found a better fit for simple mathematical models of decision makers' behavior when less information was available. These findings appear intuitively reasonable and point to the need to provide sufficient amounts of relevant information to decision makers while minimizing the amount of irrelevant information present.

Two additional findings from laboratory studies of decision making are germane to the understanding of information overload and underload but are not immediately obvious. First, a number of studies have documented decision makers' tendencies to seek more information than required, even to the point of inducing overload (Driver & Mock, 1975; Schroder, Driver, & Streufert, 1967; Sieber & Lanzetta, 1966). Oskamp (1965), for example, reported that past a certain point, decision making performance was unaffected by more information, yet additional information was sought to increase the decision maker's confidence. Connolly (1977) notes that the familiar finding from Bayesian studies of decision making that subjects revise their probabilities less than normatively justified by the diagnosticity of the information may suggest that an individual would need to gather more information than strictly necessary to reach some given level of confidence. These studies, and others, also show that although the excess information obtained may actually lead to decreased decision making accuracy, subjects' confidence and satisfaction with the decision increases. Chervany and Dickson (1974), for example, provided decision makers either with data summarized through the use of descriptive statistics or with the raw figures. Subjects using the summarized data: (1) made higher quality decisions, (2) took less time to make the decision, and (3) had less confidence in the decisions than those using the unaggregated data. Jacoby, Speller, and Kohn (1974), in a marketing experiment, found that consumers who were provided more information felt more satisfied and less confused, but they made poorer decisions than did consumers given less product information. Although some questions have been raised about the Jacoby et al. study—for example, Wilkie (1974)—the basic findings remain largely unchanged.

Overall, these findings suggest an interesting paradox. It may be that individuals do not accurately perceive their objective information processing limits. Rather, more information than can be optimally processed is sought. This increased information load may make it difficult for accurate identification of relevant cues and may result in decreased performance. Consistent with the findings of Chervany and Dickson (1974), Oskamp (1965), Connolly (1977), and others, it may be that individuals, rather than perceiving this decrement in performance, will express greater confidence and satisfaction in these poorer judgments. Hence, the availability of a large amount of information may result in poorer performance but increased confidence and satisfaction.

Although the laboratory evidence supports these interpretations, a number of authors have noted that laboratory studies of information processing and decision making may not possess external validity (Beach, 1975; Slovic, Fischhoff, & Lichtenstein, 1977; Winkler & Murphy, 1973). O'Reilly and Anderson (1979), for example, have noted that in actual organizations, unlike most laboratory simulations, information may be ambiguous, available at different times and from various sources, and users may be subject to a variety of pressures and distractions not adequately reflected in laboratory studies. The general lack of research into the impact of situational factors affecting actual decision making makes it difficult to know how much of the laboratory-based knowledge is useful in understanding actual information use by organizational participants.

The purpose of this study is to provide a preliminary test, using questionnaire data from actual organizational participants, of the following hypotheses:

Hypothesis 1: Subjects who report themselves to be underloaded (i.e., those who report receiving less than the amount of information necessary for their job accomplishment) will perform better than will those who report themselves as comparatively overloaded.

Hypothesis 2: Subjects who report themselves to be underloaded will be generally less satisfied than will be those who report themselves as overloaded; that is, information underload, as compared to relative overload, will be associated with:

(2a) lower job satisfaction

(2b) lower overall satisfaction with communication in the organization.

STUDY 1

Method

Subjects—Respondents were all personnel assigned to three navy aviation units. Data were collected once 3 months after the units were formed ($n = 579$, an 81 percent response rate) and again 12 months later ($n = 814$, an 80 percent response rate). Data for 252 of the respondents present at time 1 were also collected at time 2 for an overlap of 44 percent between times 1 and 2.

At the time of the first data collection the three organizations were undifferentiated from each other and were pursuing highly similar goals with comparable organizational structures and technologies. Average age and tenure in the navy were 26.8 and 7.8 years, respectively. At the time of the second data collection, the units had separated into three distinct organizations but otherwise remained almost identical in terms of structure, personnel, goals, and technology. Average age and tenure in the navy were 25.8 and 7.0 years.

Measures—Respondents from both samples completed a questionnaire packet which included demographics and assessments as follows:

1. Information underload/overload was measured using three items from a communication questionnaire (Roberts & O'Reilly, 1974). Subjects indicated, on 7-point Likert scales, the frequency and extent to which they felt they had either too little or too much information. Factor analyses showed only a single underlying dimension for each sample. Items, means, standard deviations, and Cronbach alphas are shown in Table 1. The index is scored so that a high score represents relative information overload and a low score indicates relative underload.
2. Satisfaction with communication was drawn from the communication questionnaire developed by Roberts and O'Reilly (1974). This item is an adaptation of the GM Faces Scale developed by Kunin (1955) and asks respondents to indicate, on a 7-point scale, the extent to which they are satisfied with communication in general in their organization.
3. Job satisfaction was assessed using the JDI (Smith, Kendall, & Hulin, 1969), which measures satisfaction with five aspects of the job: work itself, co-workers, promotion, pay, and supervision.
4. Sociometric role was determined by questioning respondents, during each data collection, as to whom they were likely to contact to obtain technical advice; i.e., task-oriented communication. The format of the question required the subject to list the names of those persons contacted. Using a recently developed sociometric analytic technique (Richards, 1974), these data were analyzed and, based on the number of communication links with others, were identified as belonging to one of three general communication roles: (1) isolates, or those with only one or two consistent contacts, (2) participants who are tied to more than one other participant but who are not consistently related to a set of other group members, and (3) group members or those subjects with over 50 percent of their contacts with a consistent set of three or more other participants. These three roles, described in detail elsewhere (Roberts & O'Reilly, 1978, 1979), permit subjects to be arrayed according to their volume of task-oriented communications. These sociometric data were used to obtain some independent assessment of the validity of the questionnaire measure of underload/overload.

Individual performance data were collected in the form of supervisor's ratings for the time period of the data collections. Performance data were available for 298 enlisted personnel in the first six military pay grades for time 1 and 151 of these same individuals at time 2.

Respondents at time 2 also completed a perceptual measure designed to assess work group effectiveness (Mott,1972). This instrument includes eight items assessing productivity, adaptability, and flexibility. Mott (1972) reports reliability and validity data from studies of three organizations. The correlation between this perceptual measure of effectiveness

TABLE 1
Items, Means, Standard Deviations, and Cronbach Alphas for Information Underload/Overload Index

Item	Time 1		Time 2	
	$\bar{X}$	*SD*	$\bar{X}$	*SD*
1. In a typical work week, approximately how often do you have *less* than the amount of information you could consistently handle for making the best possible work-related decision? (1 = very often, 7 = not often)	3.95	1.7	4.28	1.6
2. Sometimes at work you may receive more information than you can efficiently use. At other times, however, you may feel that you are not receiving all the information you need. How often during a week would you say that this lack of information arises? (1 = very often, 7 = not at all often).	3.90	1.6	4.30	1.6
3. Is the total amount of information you receive in a typical work week enough to meet the information requirements of your job? (1 = not enough at all, 7 = too much)	3.91	1.3	4.07	1.1
Cronbach alpha	.71		.74	

and the supervisor's rating of an individual's performance was $r = .16$ ($n = 151$, $p < .02$, one-tailed test).

Results

In order to provide some assessment of the underload/overload measure, it was hypothesized that respondents classified by the sociometric procedure as isolates would be more likely to indicate information underload than would subjects who were either participants or group members. Because the sociometric data indicate the level of communication activity of the subjects, it was expected that those who had comparatively fewer task-oriented contacts would perceive themselves as having less information than would those with a greater number of contacts. A one-way analysis of variance for the three communication roles (isolate, participant, group member) with the information underload/overload index as a dependent variable was conducted for time 1 and time 2 data. The differences across roles were significant for both time periods ($p < .001$ at time 1 and $p < .10$ at time 2), indicating that isolates were more likely to indicate information underload.

Table 2 presents the simple correlations among underload/overload, satisfaction, and individual performance for the two time periods. Recall that a low score is indicative of information underload, or the perception that less than the desired amount of job-related information is being received. The results thus indicate that information underload is associated with lower satisfaction but higher performance. Restated, subjects who are comparatively overloaded with information express greater satisfaction with both the job and communications in general, but they are rated by their superiors as performing less well than respondents receiving less information. These findings are consistent across the samples and support both hypotheses postulated.

TABLE 2
Correlations Among Information Underload/Overload, Performance, and Satisfaction

	Sample	
	Time 1 (n=579)	*Time 2 (n=814)*
1. Performance[a]	–.12*	–.19*
2. Satisfaction with communications	.34**	.32**
3. Work satisfaction	.13**	.11**
4. Pay satisfaction	.15**	.11**
5. Promotion satisfaction	.14**	.11**
6. Supervisor satisfaction	.17**	.16**
7. Co-worker satisfaction	.13**	.15**

[a] $N=298$ for time 1 and 151 for time 2.
*$p<.05$
**$p<.01$

Although the results in Table 2 demonstrate that respondents who perceive themselves as comparatively underloaded are more likely to be rated as performing better, the correlation between perceived group effectiveness and underload-overload suggests the opposite ($r=.24$, $p<.01$). This relationship suggests that not only is underload associated with relative dissatisfaction but also with perceptions of decreased effectiveness. Respondents who are comparatively overloaded express greater satisfaction and more positive assessments of effectiveness, although rated performance is likely to be lower than for those who feel underloaded.

As previously indicated, the data collections occurred a year apart. Comparable performance data were available for 298 enlisted personnel at time 1 and 151 of these same individuals at time 2. Using these subjects, cross-lagged panel correlations (Kenney, 1975) were computed in an attempt to make inferences about the causal ordering between information underload/overload and performance. Table 3 presents the cross-lagged correlations. Based on recent criticisms of the use of the dynamic correlation coefficient (James, Hornick, & Demaree, 1978), no attempt was made to use this statistic.

TABLE 3
Cross-lagged Correlations Between Information Underload/Overload and Performance Over a 12-Month Period[a]

Communication Variable	*Reliabilities*		*Static Correlation*		*Cross-Lagged*		*Corrected Z value*[b]
	$r_{1a\,1b}$	$r_{2a\,2b}$	$r_{1a\,2a}$	$r_{1b\,2b}$	$r_{1a\,2b}$	$r_{2a\,1b}$	
1. Information underload/overload	.30**	.17*	–.18*	–.28**	–.10	–.03	NS

[a] $N=298$ at time 1, $N=151$ at time 2, and $N=115$ at both time 1 and time 2.
[b] Correction formulae contained in Kenney (1975) with differences evaluated using a one-tailed test.
*$p<.05$
**$p<.01$

Both the reliabilities and synchronous correlations are significant and appear to demonstrate stationarity. Following Kenney (1975), reliability ratios were computed for use in correcting the correlation coefficient for attenuation, and then tests were made for significance in differences between the cross lags. No significant difference was discovered, so no inferences can be drawn.

STUDY 2

Method

Subjects—A survey was made of 163 subjects employed in 4 branch locations of a county welfare agency. All respondents were eligibility workers whose duties required them to screen applicants for assistance and to make decisions about the type and amount of assistance to be provided. Each subject had approximately the same case load, was employed at the same level, made decisions based on the same sets of regulations, and had access to the same information sources. This sample of 163 included 72 subjects for whom objective performance data was available. Average job tenure was 2.5 years.

Procedure—Each branch location was visited by the investigator, meetings were held with the respondents, and a questionnaire was administered and collected. Of the 190 workers released to participate in the study, 27 declined to complete the survey (a response rate of 85 percent).

Measures—Two measures collected in the larger study are relevant here:

1. Information underload/overload was measured using three questionnaire items similar to but not identical with those used in Study 1. Subjects responded, on 5-point scales, to the following three questions: (a) "Sometimes you may receive more information than you really require to make decisions. When this occurs, how often does the information come from handbooks, files, etc.?" (b) "At times you may not have enough information to make decisions. On the average, how likely is the following information source (written materials) likely to fail to provide the necessary information?" and (c) "Of all the information you use to make decisions in your job, how much comes from handbooks, files, etc.?" Correlations among these three items ranged from $r = .23$ to $r = .36$. Cronbach $\alpha = .58$.

2. Job satisfaction was assessed using the GM Faces Scale developed by Kunin (1955).

3. Decision making performance was assessed by independent auditors who examine a random sample of each eligibility worker's cases. Auditors accumulate errors made in overpayments and payments made to ineligible recipients. For each of the 72 respondents in the sample, decision making performance was available in the form of an error rate, that is, the total number of cases with errors divided by the number of cases reviewed.

These data were collected from the auditing unit and provide an objective measure of decision making performance.

Results

The simple correlation between reported overload and error rate was $r = .20$ ($p < .05$). Recall that error rate is the average number of errors per case. This relationship thus indicates a negative association between performance and decision making accuracy; that is, the greater the overload, the higher the error rate, consistent with the relationship postulated in Hypothesis 1.

For the entire sample of 163 subjects the correlation between job satisfaction and reported overload was $r = .20$ ($p < .01$). This is consistent with Hypothesis 2a. For the subsample of 72 eligibility workers for which performance data was available, the correlation between satisfaction and overload was $r = .07$ (NS). Hence, only weak support for Hypothesis 2a is shown.

DISCUSSION

Overall, the findings presented here are consistent with the results of laboratory studies that have demonstrated that past some optimal point too much information can lead to decreased decision making performance but increased feelings of satisfaction. In organizational settings there are a number of possible explanations for such results.

First, participants in organizations, unlike those in typical laboratory decision making experiments, are usually pursuing a number of tasks simultaneously. It is not always clear what information will be needed or when it might be useful. Hence, the nature of the job may require incumbents to gather a large amount of information with the possibility that a portion of it might be important at some future time. This may result in a tendency to ask for more information than is strictly needed in an effort to avoid mistakes and reduce uncertainty.

Organizational participants may also be subject to pressures and distractions that can reduce their ability to process information (Janis & Mann, 1977; Wright, 1974). Not only does pressure interfere with the detection and use of relevant information, but the mere presence of irrelevant signals may also distract decision makers. For example, in a laboratory study of decision making, Troutman and Shanteau (1977) found that judges often allowed irrelevant or nondiagnostic information to influence their decisions. Hence in the studies reported here, subjects who report having more information and being more satisfied may be less able to select and use relevant information because of pressures and distractions that reduce the time available for processing as well as because of the difficulty in identifying relevant information from the total set available.

Finally, a substantial amount of evidence is available that demonstrates that decision makers' choice behavior can be modeled as using relatively few informational cues (Dawes & Corrigan, 1974). Although this does not prove that decision makers use only a few cues, it does suggest that comparatively few cues may contain much of the needed information. Additional items may be associated with increased satisfaction and confidence, but not necessarily increased performance.

The results of these studies demonstrate that perceived information overload is associated with decreased performance, but they do not necessarily suggest that overload is bad. The fact that underloaded subjects express lower satisfaction may be a cause for concern. O'Reilly (1978), for example, has found lower satisfaction to be associated with an increased tendency by senders to distort information during transmission. It also is possible that judges with less information, although rated as higher performers, may be slower to act due to less confidence in their decisions. Information overload may also reflect a redundancy of information necessary to insure reliable performance standards in certain critical areas (Landau, 1969). Overall, the results may suggest the need, not for less information, but for a more careful dissemination of information available within the organization, with particular attention to information-dependent jobs or units.

Several limitations of this study need to be acknowledged. First, the measurement of underload/overload used here is a perceptual one. Although the sociometric data from Study 1 provide some evidence of validity, the perceptual nature of the measure undoubtedly reflects not only variations in actual information processing but also affective judgments by the individual and measurement error. Although the item mean scores (Table 1) suggest no serious bias within the samples toward either underload or overload, more validation is needed. It may be, however, that variations in *perceived* overload are more important determinants of behavior than are objective assessments. Future research might profitably explore those conditions that are associated with either perceptions of overload or underload. Some literature exists that documents differences in information processing abilities (Schroder et al., 1967; Taylor, 1975; Taylor & Dunnette, 1974). These individual variations in processing abilities may be associated with differences in overload and underload given a constant rate of information input. Other literature calls attention to situational differences that may result in differing requirements for the information load, complexity, and uncertainty to be processed (Tushman, 1978; Tushman & Nadler, 1978). Both situational and individual differences may be associated with information underload/overload.

Another weakness of the present investigation is the reliance in Study 1 on an overall measure of performance rather than a direct examination of decision making performance. Because the critical impact of information underload/overload is likely to be on decision making, the results of Study 2, with a direct assessment of decision making accuracy, are seen as important. Similarly, although job satisfaction may partially reflect satisfaction with communication and information availability at work, it can be argued that this construct is not closely related to actual information use. An examination of the weak but significant correlations between underload/overload and job satisfaction offers some support for this argument. In Study 1, however, respondents also indicated their satisfaction with communication in the organization. This measure was a part of a larger questionnaire focusing directly on the transmission and use of information within the organization and should be more closely related to the affective responses found in laboratory studies. Results in Table 2 show this to be the case, with underload/overload more strongly related to this measure than to job satisfaction. Hence, some measurement problems exist in the studies reported here which should be rectified in future studies.

Finally, although the laboratory studies of information use demonstrate the causal impact of variations of information on decision making performance, no causal inferences can be drawn from the studies reported here. Causality, however, remains an important issue. The positive correlation between relative overload and the perceptual effectiveness measure in Study 1 suggests that information users may not appreciate the impact of information load on performance. Results reported by Staw (1975) suggest that performance may be attributed by individuals to certain situations. This may give rise to a belief that "more information is better." Future research should explore the relationships between information load and performance far more carefully than has been done here. The results of this study, consistent with those of numerous laboratory investigations, suggest that information load may indeed have an impact, but one that is not as intuitively obvious as some might believe.

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Informational Cues and Individual Differences as Determinants of Subjective Perceptions of Task Enrichment[1]

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The influences of both manipulated enrichment informational cues and individual differences on subjective job perceptions were examined. Results indicate that both the manipulation and individual differences contributed statistically and practically significant variance in the prediction of subjective job perceptions. The implications of these results for job design research are discussed.

Although "perceptual psychologists have repeatedly shown that there is no simple one-to-one relationship between the actual stimulation in the environment and what is being perceived" (Hansen, 1976, p. 122), the vast majority of job design investigations have employed participants' subjective perceptions as measures of task characteristics. It has been argued that such subjective perceptions of task enrichment constitute appropriate measures of the jobs being investigated because incumbents respond, not to objective job characteristics, but to the way they perceive those task dimensions. In order to redesign jobs based on the information provided by investigations that focus on subjective task perceptions, however, it is important to understand the pattern of associations among such perceptions and objective task, organizational, social, and individual variables. The present study was designed to explore the relative contributions of two of these factors, informational cues from others regarding task enrichment

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and individual differences, in the prediction of task enrichment perceptions. Recent research (O'Reilly & Caldwell, 1979; Weiss & Shaw, 1979; White & Mitchell, 1979) has indicated that information from others can be a major determinant of enrichment perceptions. In addition to replicating this finding, it was further anticipated during the current investigation that participants who differed in terms of relevant individual characteristics would attend to different aspects of the information available about the task they worked on and, therefore, would vary in the degree to which they perceived that job to be enriched.

One would naturally expect that objective task characteristics would have a substantive causal impact on task perceptions. Several authors, however, have recently indicated that factors other than the task itself (e.g., individual differences, social influences) also may account for a substantive portion of the variance in perceptual measures of task enrichment (Hackman, Pearce, & Wolfe, 1978; Salancik & Pfeffer, 1977, 1978; Schwab & Cummings, 1976). Salancik and Pfeffer (1977, 1978), for example, recently have questioned the degree to which job characteristics are fixed objective realities. These authors have argued that individuals may develop perceptions of job characteristics based on the informational cues from others about their jobs. To the degree that characteristics of a job are ambiguous, each worker is seen as "likely to use social information in developing his or her perceptions of the meaningfulness, importance, and variety of the job" (Salancik & Pfeffer, 1978, p. 228).

Several current investigations have provided empirical support for Salancik and Pfeffer's (1977, 1978) arguments. Brief and Aldag (1978), for example, have recently reported a low average correlation of -.16 between supervisor and incumbent descriptions of job characteristics. Although somewhat higher inter-observer correlations between perceptual measures of the same job have been reported by other authors—Hackman & Oldham (1975), .51 & .63; Hackman et al. (1978), .49—these data indicate that well over 50 percent of the variance in the incumbents' perceptions is not accounted for in the perceptual descriptions provided by other observers. Such findings raise serious questions concerning the congruence between objective reality and perceptual task measures.

Additional and more direct support for Salancik and Pfeffer's (1977, 1978) arguments has recently been provided by several other investigators. O'Reilly and Caldwell (1979), for example, have presented data indicating that informational cues about whether a task is enriched or unenriched are the major determinant of enrichment perceptions. In their study, objective task characteristics were found to affect task perceptions, but informational cues had an even stronger influence on those enrichment perceptions. These outcomes appear to suggest that job characteristics, to a large extent, may be socially constructed realities. Similar results reported by both White and Mitchell (1979) and Weiss and Shaw (1979) also indicate that information provided by other workers has a significant effect on task perceptions. King (1974), in a field experiment, has shown further that managers' expectations about job design outcomes can significantly affect the performance levels achieved after job design changes. In summary, it would appear that information from others has been shown to be a major factor in shaping both perceptions of and responses to job characteristics. Furthermore, the flow of such evaluative information from other workers concerning one's job is probably a common organizational phenomenon. Written and tape recorded informational cues from others were, therefore, used as the mechanism by which to manipulate specific job enrichment dimensions during the current experimental investigation. These informational cues were interspersed within the training instructions provided for the participants. All subjects in both conditions actually worked on the same physical task. This physical task was designed to be low in objective job enrichment and, therefore, to be approximately congruent with the informational cues provided in the low job enrichment condition. Feedback from pilot subjects confirmed that the physical task used met this criterion. Because all subjects in both conditions worked on the same physical task, task difficulty was held constant and did not differentially influence task perceptions across experimental treatment groups.

Two additional aspects of the use of informational cues to manipulate job enrichment during the current study deserve further attention. First, it should be noted that similar descriptive experimental inductions, in the absence of objective task differences, have been used successfully by prior investigators to manipulate certain aspects of job enrichment. Umstot, Bell, and Mitchell (1976) and White and Mitchell (1979), for example, manipulated task significance in this manner. Umstot et al. (1976) also used this approach to implement a portion of their autonomy manipulation. White and Mitchell's (1979) use of systematic variations in the information provided to subjects in order to manipulate an aspect of job enrichment is particularly interesting. Their study was specifically designed to investigate the relative effects of job enrichment and social cues on subjective task perceptions.

Second, it should be noted that the current job enrichment manipulations combine aspects of both prior job enrichment and social cue manipulations. Although the task characteristics being varied were drawn from the job enrichment field, the mechanism employed to manipulate these dimensions involved the use of informational cues. Such cues, as discussed above, have recently been shown to have a strong impact on subjective task perceptions. The type of informational cues used in this study, however, differ somewhat from those used by past job design investigators. Weiss and Shaw (1979), for example, explored the effects of general nonspecific attitudes on task perceptions, but the present study provided subjects with specific cues regarding the relative presence or absence of the job enrichment dimensions being manipulated. This was done to increase the probability of establishing a strong linkage between the job enrichment manipulation and reported perceptions of task enrichment. The presence of such a strong linkage appeared to provide an ideal situation in which to make a conservative test of the main question of interest in the current investigation (i.e., the degree to which individual differences, in addition to manipulated enrichment, contribute to the prediction of variance in subjective task perceptions).

Hackman (1969), discussing the factors that contribute to task redefinition, pointed out the need for research directed at clarifying the individual differences that contribute to this process. While addressing a related problem, Schwab and Cummings (1976) identified several potential problems that may arise as a result of using perceptual task scope measures within job design investigations. These authors argue that subjective perceptions may well confound characteristics of tasks and individual differences, thereby providing few cues as to how such job characteristics should be manipulated in actual work situations. In addition, method variance may often have confounded associations between perceptual task measures and other perceptual dependent variables of interest (i.e., job satisfaction, motivation).

Ilgen, Campbell, Peters, and Dugoni's (1978) findings indicating that perceptions of task requirements vary as a function of both individual differences and task characteristics appear to provide initial empirical support justifying these concerns. These authors examined the influences of individual differences (i.e., demographic and personality characteristics) and task variables (i.e., four different assessment center exercises) on the degree to which each of eight specially constructed task dimension scales was perceived to represent attributes important to performing successfully. Data were collected within the controlled setting provided by a series of assessment centers. While participating in the assessment centers, 127 upper-middle level state civil service managers rated the importance of each of eight task dimensions (decision making, decisiveness, initiative, oral communications, problem analysis, planning and organizing, leadership, and interpersonal relations) for successful performance on each of four exercises. The results indicated that the systematic differences in the task dimensions perceived to be important for success were a function of both the exercise tasks and the individual differences of the perceiver.

Investigating a similar question within two laboratory experiments, Lorenzi, Sims, and Slocum (1979) found that perceived environmental uncertainty was strongly related to objective uncertainty manipulations. Measures of individual characteristics (i.e., ability, personality, and demographic) also, however, were significantly associated with general measures of perceived environmental uncertainty. Both Ilgen et al. (1978) and Lorenzi et al. (1979) have provided initial support for the impact of individual differences on aspects of incumbents' task perceptions. Further work, however, is needed to clarify the specific influences of individual differences on subjective perceptions of task enrichment. Initial data, reported by Stone (1979), suggest that field independence may be a determinant of such task enrichment perceptions. The inconsistent directionality evident within the significant relationships presented between field independence and task perceptions, however, makes Stone's results somewhat difficult to interpret, particularly in the absence of manipulations of either task characteristics or the work environment. The current study, however, should help clarify such associations by examining the effects of both a larger set of individual differences and manipulated informational cues regarding task enrichment.

Three individual difference variables (field independence, general mental ability, and intrinsic work orientation) were measured during the present study. Barrett, Cabe, Thornton, and O'Connor (1975a) and Stone (1979) have related field independence to aspects of task perceptions. These findings appear consistent with prior research which has indicated that field independent individuals tend to be more intellectually analytical, perceptually discriminating, socially independent, and self-reliant than their more field dependent counterparts. Field dependent people, by contrast, tend to be more perceptually undifferentiated and socially dependent or other directed (MacEachron, 1977). The tendency of field dependent individuals to make relatively more use of the information provided by others becomes increasingly evident as situations become more ambiguous (Witkin & Goodenough, 1977). It was expected that the unfamiliar task that participants performed during this study's short three-hour work period would probably constitute such an ambiguous situation. Under such circumstances, field independent and field dependent participants might be expected to focus on different aspects of their task and work environment. Field independent individuals, for example, being more analytical and socially independent, might be expected to focus more closely on the physical task and be less affected by the socially induced informational cues than their field dependent counterparts. Given that the physical task was designed, and confirmed by pilot subjects, to be very low in enrichment, field dependent participants, on average across the two information cue conditions, therefore, might be expected to perceive and report higher levels of job enrichment. It would seem that this difference in the task perceptions of field dependent and field independent persons might be greatest, however, in the enriched condition where the physical task and social informational cues differed most. As a result, it was expected that significant variance in task perceptions would be associated with a main effect for field independence–field dependence and by the interaction of this individual difference and the enrichment manipulation.

Similar results were anticipated for a second individual difference, general mental ability. According to Wesman (1965), those individuals with higher levels of general mental ability have a greater capacity to perceive relevant relationships and reason appropriately. It was anticipated that individuals higher in such perceptual and reasoning abilities might be more likely to give critical appraisal and ignore the information provided by others when it was inconsistent with the physical task they were performing. As a result, it was expected that, on average, those with higher levels of general mental ability would tend to perceive their jobs as less enriched.

As with field independence, however, it would seem that this difference in the task perceptions of those high and low in general mental ability might be greatest in the high enrichment informational cue condition. As a result, it was expected that significant variance in task perceptions would be associated with a main effect for general mental ability and by the interaction of general mental ability and the enrichment manipulation.

Psychologists have long been aware that needs and values affect perceptions (Bruner & Goodman, 1947). A measure of intrinsic work orientation, therefore, was included within the current investigation with the expectation that those who valued rewards from the work itself most highly would tend to perceive their tasks as more enriched. This prediction is consistent with prior survey results reported by Hackman and Oldham (1975) in which individuals with higher levels of growth need strength perceived their jobs to be significantly higher in job enrichment. Stone (1975) has also presented survey data in which perceived enrichment was significantly and positively associated with work related values. Although alternate explanations exist for such results (e.g., that people with higher intrinsic work orientation seek out jobs that are high in objective levels of job enrichment), the current investigation was designed to provide a more conclusive test of the degree to which individuals with higher intrinsic work orientation tend to perceive objectively similar jobs as more enriched.

Those with higher intrinsic work orientation were, on average, expected to perceive their jobs as more enriched, but it was anticipated that such differences in perceptions across people might be strongest in the high enrichment condition in which informational cues were provided that could be attended to in order to support such beliefs. As a result, it was expected that significant variance in task perceptions would be associated with a main effect for intrinsic work orientation and by the interaction of intrinsic work orientation and the enrichment manipulation.

In summary, it was hypothesized: *(1) that the informational cue manipulation of enrichment would contribute significantly to the prediction of subjective task perceptions, (2) that the individual difference measures would each contribute additional variance in the prediction of subjective task perceptions beyond that accounted for by the manipulation of enrichment, and (3) that the interactions of manipulated enrichment and each of the individual difference measures would also contribute additional variance in the prediction of subjective task perceptions beyond that accounted for by the main effects associated with these variables.*

METHOD

Subjects

Subjects were 90 male undergraduate students from a midwestern university who volunteered to participate in a psychology experiment for $2 per hour. Each of the participants responded to an ad in the school newspaper and was randomly assigned to one of two experimental treatment conditions. Randomization was accomplished by counterbalancing the day and time the different conditions were given while assigning individuals to the time slots that fit their school schedules. The pattern of treatment days and hours was reversed each week throughout the experimental sequence.

Experimental Task

While working on the experimental task, participants were seated at one of four wooden booths located side by side. Each booth was enclosed (i.e., front and two sides) such that the subjects were separated from each other.

The physical task employed was developed in order to simulate important aspects of trouble-shooting maintenance work on complex electronics equipment. Subjects followed an intricate series of diagnostic instructions and matrices to determine the location of malfunctioning components within the simulated equipment. Each piece of equipment was represented by a box of 490 punched computer cards. All decks for each subject were identical with the exception of a varying series of simulated malfunctioning components inserted in each deck. These malfunctioning components consisted of inserted cards with incorrectly punched hole configurations.

Experimental Design

The design consisted of two levels of informational cues which described the degree to which subjects' tasks were either enriched or unenriched. Steers and Mowday have pointed out the present lack of empirical support for the relevance of those task characteristics typically included within job enrichment investigations and have suggested that "perhaps other more important characteristics have not been defined into the existing models" (1977, p. 655). During the current investigation high and low job enrichment conditions were developed through the systematic manipulation of informational cues regarding the relative presence or absence of four task dimensions (task identity, responsibility, feedback, and the opportunity to learn new skills) which differ somewhat from the task characteristics typically employed in prior job design research (Hackman & Oldham, 1975). These dimensions were selected based on both their theoretical relevance and their importance to the nature of the work under investigation (i.e., maintenance of complex electronics equipment). Importance judgments were made based on an extensive literature review, an examination of relevant job descriptions, and a content analysis of interviews with 20 workers employed on jobs similar to the one being simulated during the current investigation.

In the low socially influenced enrichment condition, participants were given informational cues indicating that their job was low in responsibility, feedback, task identity, and the opportunity to learn new skills. In the high enrichment treatment, however, it was suggested that substantive amounts of these attributes were present. These manipulations were presented as part of the written task instructions reinforced by message cards inserted in the equipment decks and further emphasized by tape recorded comments inserted within the maintenance task training instructions. Task identity, for example, was manipulated by informing the low task enrichment participants that they could complete only a small repetitive portion of the overall job. In contrast, high condition participants were told that they could do a whole piece of work from beginning to end and therefore complete all needed maintenance work on each piece of equipment.

Manipulation of the remaining three task attributes emphasized this notion of doing either part of a job or a total task. Feedback was manipulated by informing high enrichment participants that the maintenance jobs they worked on could be tested immediately after each job was completed. These individuals were told, therefore, that they would be given feedback regarding the amount and quality of their performance. In contrast, low enrichment participants were led to believe that the extensive time required to test suggested repairs in all equipment decks would make it impossible to provide them with feedback on their performance.

Responsibility was manipulated by informing high condition participants that they were fully accountable for whether malfunctions were corrected because they had both the expertise and test equipment needed to locate any potential problem areas. Alternatively, low enrichment participants were told that their work was specialized. They were, therefore, led to believe they could correct malfunctions in only limited subsections of the total equipment decks, making them only partially accountable for whether malfunctions were fully repaired.

The high level of learning new skills was induced by informing high enrichment participants that the job provided a unique opportunity to learn a valuable systematic approach to problem solving which could be generalized to other areas of their personal lives. In contrast, low condition participants were informed that the task they were about to perform was repetitive in nature, making it improbable that they would learn anything that would be useful to them in their personal lives.

Procedures and Measures

Participants in each condition reported on three separate days for individual difference testing, training, and work on the simulated maintenance task. The tests of field independence, general mental ability, and intrinsic work orientation were administered on the first day. Specifically, the participants completed the Rod and Frame Test (Witkin, Lewis, Hertzman, Machover, Meissner, & Wapner, 1954), the Group Embedded Figures Test (Witkin, Oltman, Raskin, & Karp, 1971), Form A of the Wesman Personnel Classification Test (Wesman, 1965), and the Survey of Work Values (Wollack, Goodale, Wijting, & Smith, 1971). Although the Rod and Frame Test, which asks subjects to adjust a tilted rod to the vertical position, and the Group Embedded Figures Test, which requires that subjects locate simple figures within complex backgrounds, are both measures of field independence, prior findings have occasionally indicated a lack of convergence of results using these apparatus and paper and pencil measures (Gruenfeld & Arbuthnot, 1969). Because prior researchers (Barrett, Cabe, & Thornton, 1968; Wachtel, 1972) have reported a lack of linearity between the Rod and Frame Test and paper and pencil measures of field independence, both types of tests were included within the current investigation. Thornton and Richards (1969) have demonstrated that tests scored in terms of items per time require a reciprocal transformation to correct for inherent curvilinearity. This transformation was, therefore, performed on the Group Embedded Figures Test scores.

The Wesman Personnel Classification Test, also included in the current test battery, is a measure of two aspects of mental ability—verbal reasoning and numerical ability. As suggested by Wesman (1965), scores on these two parts of the test were combined to obtain an index of overall general mental ability.

The Survey of Work Values, a measure of the meaning an individual attaches to his or her work role, was also administered to all study participants. The three subscales that address attitudes regarding the intrinsic aspects of work (pride in work, job involvement, and activity preference) were summed into a standardized linear composite measure of intrinsic work orientation during the current study.

All subjects were trained to perform the laboratory tasks on the second day. On the third day, participants worked on the experimental tasks for three hours. Each individual was allowed to work at his own pace while searching for malfunctions in the simulated electronics equipment. Between one and three jobs to be completed were kept available to each individual at all times.

Two measures of task perceptions were obtained after participants completed work on the experimental task. The measures administered included the Attribute Description Scale (ADS) (Barrett, Bass, O'Connor, Alexander, Forbes, & Cascio, 1975d) and a modified version of the Work Itself/Work Environment Description Questionnaire (WIWE) (Cascio, 1973). Both the ADS and WIWE measured participants' perceptions of the experimental task in terms of responsibility, feedback, task identity, and the opportunity to learn new skills. These instruments were developed based on literature review, survey, and interview information which indicated that responsibility, feedback, task identity, and the opportunity to learn new skills were the four job enrichment attributes that best satisfied the simultaneous criteria of (1) being perceived as most important to complex electronics maintenance productivity and (2) being most preferred by relevant maintenance personnel. No other instruments that assess these four specific job characteristics manipulated during the current investigation are known to the current authors. Both of these recently developed measures of task perceptions, therefore, were included within the current study in order to increase confidence in the generalizability of the findings. The correlation between these two scales within the current data was .66 ($p < .001$). A correlation of this size would seem to indicate that these scales are measuring aspects of the same construct. The size of the potential unique variance component assessed by each scale, however, suggests that both measures might provide useful and somewhat different contributions towards understanding the influences of informational cues and individual differences on subjective task perceptions.

The items selected to represent each of the four important task attributes were chosen from a pool developed utilizing a Smith and Kendall (1963) retranslation procedure. To construct the ADS, these items were built into paragraph long job descriptions of potential maintenance tasks. The amount of each attribute represented in the job descriptions was varied by injecting high and low scaled expressions of frequency into the items. Sixteen job descriptions, varying in terms of the four task attributes, were created in this manner. Experimental participants ranked these descriptions in order from those jobs that best described the experimental task they had just completed to those that were least descriptive of that work. These rankings then were scored in terms of the amount of each of the four task attributes described as present, and these four scores were summed to calculate the total amount of attributes the participants perceived as present in the laboratory tasks.

Evidence supporting the reliability and validity of the ADS can be drawn from several studies. An alternate form reliability coefficient of .81, for example, was obtained in the sample of 50 enlisted Naval personnel during the development of the questionnaire. Job design theory suggests that task enrichment should be positively associated with satisfaction and negatively related to turnover. Consistent with these predictions, Barrett et al. (1975d) have reported that, in a sample of 30 enlisted Naval personnel, ADS scores were significantly associated with both work satisfaction (.57, $p < .001$) and length of past Naval service (.43, $p < .05$). In addition, significant positive associations between ADS scores and work satisfaction were found during two past laboratory investigations (Barrett, Forbes, Alexander, O'Connor, & Balascoe, 1975b; Barrett, O'Connor, Alexander, Forbes, Balascoe, 1975c). These preliminary results provide initial support for and validity of the ADS as a measure of perceived task enrichment.

The Work Itself/Work Environment Description Questionnaire was also administered as a second measure of participants' perceptions of the presence of task attributes. Items were developed from the literature review, survey, and interviews described above. The universe of job views described above. The universe of job related elements resulting from these procedures was then allocated and scaled by a pool of 150 judges following a Smith and Kendall (1963) retranslation procedure. The results of this procedure provided evidence supporting the construct validity of the final items selected to measure responsibility, feedback, task identity, and the opportunity to learn new skills. These items were cast in behaviorally anchored scales and used by the participants to describe the experimental tasks they had just completed. A test-retest reliability coefficient of .83 for the WIWE total score (sum of the responsibility, feedback, task identity, and learning new skills dimensions) was obtained over a two-week interval in a sample of 32 managerial and nonmanagerial employees. In addition, significant positive associations between WIWE scores and work satisfaction have been observed during two previous laboratory investigations (Barrett et al., 1975b; Barrett et al., 1975c). These preliminary results provide initial support for the reliability and validity of the WIWE as a measure of task perceptions.

Analysis

The major analyses used during this investigation were directed at assessing the contributions of manipulated enrichment information, individual differences, and the interactions among these variables to the prediction of subjective job perceptions. These contributions were assessed using stepwise regression analyses. The two perceptual task measures (ADS, WIWE) were each, in separate analyses, regressed on four sets of predictors. Each set of predictors included the enrichment manipulation, an individual difference, and the interaction of the enrichment manipulation and the individual difference. Because subjective perceptions have often been substituted for manipulated enrichment within job design research, the magnitude of the associations between these two types of variables were assessed directly by entering manipulated enrichment into the regression equations first. In order to seek the most parsimonious solution available, an individual difference measure was entered into each equation second, and the interaction term was entered last. Following a hierarchical procedure (Cohen, 1978; Kerlinger & Pedhazur, 1973), results were inspected to determine if each of the potential predictors, in the sequence entered, contributed significantly to the overall prediction of participants' subjective job perceptions.

RESULTS

The means, standard deviations, and intercorrelations for all measures investigated in the current study are presented in Table 1. Several associations are of note within this table. As expected, strong positive relations exist between the informational manipulation of enrichment and both subjective task perception measures—ADS (.66) and WIWE (.58). Although correlations of this magnitude do not support the substitutability of these measures (McCornack, 1956), they do suggest substantial common variance across the manipulated enrichment variable and both subjective job perception measures.

TABLE 1
Means, Standard Deviations, and Pearson Correlations among Individual Differences and Task Measures[a]
($N=90$)

Variables	*M*	*SD*	*1*	*2*	*3*	*4*	*5*	*6*
1. Wesman total[a]	38.76	8.78						
2. Rod & Frame test[b]	25.59	27.05	−.20					
3. Group Embedded Figures test[c]	.33	.22	−.29**	.55***				
4. Survey of work values intrinsic orientation[d]	124.58	12.48	.16	.19	.00			
5. Enrichment manipulation[e]	1.50	.50	.11	.13	.12	.03		
6. Attribute description scale	121.09	43.53	−.05	.29**	.30**	.22*	.66***	
7. Work itself/work environment description questionnaire	11.09	3.54	−.13	.25*	.27**	.16	.58***	.66***

[a] Wesman total is a linear composite of Wesman Personnel Classification Test verbal and numerical scores.

[b] Lower scores indicate greater field independence.

[c] Inverse transformation performed on Group Embedded Figures test raw scores. Lower scores indicate greater field independence.

[d] Linear composite of pride in work, job involvement, and activity preference scales.

[e] Manipulated conditions coded as 2 for most enriched and 1 for least enriched.

*$p<.05$
**$p<.01$
***$p<.001$

TABLE 2
Manipulated Enrichment Information, Rod and Frame Test Scores, and Subjective Job Perceptions

	Attribute Description Scale				*Work Itself/Work Environment Description Questionnaire*			
Predictors	R^2	R^2 *Change*	*df*	*F*	R^2	R^2 *Change*	*df*	*F*
1. Enrichment manipulation[a]	.431	.431	1/88	66.70**	.336	.336	1/88	44.67**
2. Rod and Frame test	.475	.044	1/87	7.27**	.365	.029	1/87	4.00*
3. Enrichment manipulation × Rod and Frame Test	.476	.001	1/86	.11	.365	.000	1/86	.00

[a] Manipulated conditions coded as 2 for most enriched and 1 for least enriched.

*$p<.05$
**$p<.01$

The lack of significant associations among individual difference measures and the enrichment manipulation would be expected, given the random assignment of participants to treatments. Both field independence and intrinsic orientation do correlate significantly with the perceptual job measures, however, suggesting that a part of subjective task perceptions may be the result of the predispositions of the perceivers. The zero-order relationships between general mental ability and the task perception measures were not significant, however.

Tables 2 through 5 present the results obtained when the two subjective job perception measures were regressed on the manipulated treatments, individual differences, and the interactions of the manipulated treatments with the individual differences. Consistent with the correlational outcomes presented in Table 1, the informational cue manipulation of enrichment accounts for a significant percentage of the variance in both the ADS (43.1 percent) and the WIWE (33.6 percent) measures of task perceptions.

As hypothesized, relations presented in Tables 2 and 3 consistently show that field independence, as measured by both the Rod and Frame and the Group Embedded Figures Test, accounts for significant additional variance in both subjective job perception measures beyond that explained by the enrichment manipulation. Field dependent subjects tended to see the job as more enriched. None of the four interactions was significant, however.

TABLE 3
Manipulated Enrichment Information, Group Embedded Figures Test Scores, and Subjective Job Perceptions

	Attribute Description Scale				*Work Itself/Work Environment Description Questionnaire*			
Predictors	R^2	R^2 *Change*	*df*	*F*	R^2	R^2 *Change*	*df*	*F*
1. Enrichment manipulation[a]	.431	.431	1/88	66.70**	.336	.336	1/88	44.67**
2. Group Embedded Figures test[b]	.480	.049	1/87	8.16**	.378	.042	1/87	5.78*
3. Enrichment manipulation × Group Embedded Figures test	.480	.000	1/86	.01	.385	.007	1/86	.95

[a] Manipulated conditions coded as 2 for most enriched and 1 for least enriched.

[b] Inverse transformations of Group Embedded Figures test raw scores.

*$p<.05$

**$p<.01$

TABLE 4
Manipulated Enrichment Information, Wesman Personnel Classification Test Scores, and Subjective Job Perceptions

	Attribute Description Scale				*Work Itself/Work Environment Description Questionnaire*			
Predictors	R^2	R^2 *Change*	*df*	*F*	R^2	R^2 *Change*	*df*	*F*
1. Enrichment manipulation[a]	.431	.431	1/88	66.70**	.336	.336	1/88	44.67**
2. Wesman total[b]	.445	.014	1/87	2.21	.376	.040	1/87	5.60*
3. Enrichment manipulation × Wesman total	.480	.035	1/86	5.79*	.381	.005	1/86	.63

[a] Manipulated conditions coded as 2 for most enriched and 1 for least enriched.

[b] Wesman total is a linear composite of Wesman Personnel Classification test verbal and numerical scores.

*$p<.05$

**$p<.01$

TABLE 5
Manipulated Enrichment Information Survey of Work Values Intrinsic Orientation Scores, and Subjective Job Perceptions

	Attribute Description Scale				*Work Itself/Work Environment Description Questionnaire*			
Predictors	R^2	R^2 *Change*	*df*	*F*	R^2	R^2 *Change*	*df*	*F*
1. Enrichment manipulation[a]	.431	.431	1/88	56.70**	.336	.336	1/88	44.67**
2. Intrinsic orientation[b]	.471	.040	1/87	6.56*	.356	.020	1/87	2.67
3. Enrichment manipulation × intrinsic orientation	.476	.005	1/86	.73	.357	.001	1/86	.07

[a] Manipulated conditions coded as 2 for most enriched and 1 for least enriched.

[b] Linear composite of pride in work, job involvement, and activity preference scales from the survey of work values.

*$p<.05$

**$p<.01$

The Wesman general mental ability measure contributed significant additional variance in the prediction of subjective job perceptions as measured by the WIWE (Table 4). The sign of the beta indicated that those subjects who were higher in general mental ability tended to perceive the jobs to be less enriched. Thus, although the zero order correlation between general mental ability and WIWE task perceptions did not reach significance (Table 1), the relationship between these variables, after controlling for the enrichment manipulation, was significant. Only the interaction of the Wesman scores and the enrichment manipulation accounted for significant additional variance in the ADS. Further analyses indicated that, as predicted, this interaction resulted from a significant relationship between general mental ability and task perceptions in the high enrichment condition (−.42, $p<.01$) and a nonsignificant association in the low enrichment treatment (.12, NS). The difference between the magnitude of these correlations was significant ($p<.05$). For the Wesman, however, neither the main effect in predicting ADS scores nor the interaction in predicting WIWE task perceptions was significant.

As predicted, the Survey of Work Values intrinsic orientation scale also contributed significant variance in the prediction of the ADS subjective job perception measure beyond that accounted for by the enrichment manipulation (Table 5). More intrinsically oriented subjects tended to see the job as more enriched. Neither the additional contribution of the intrinsic orientation scale to the WIWE perceptual job measure nor either of the interactions was significant, however.

Consistent with the above results, data from two additional summary regression analyses indicated that a unit weighted linear combination of the four individual differences accounted for significant additional variance beyond the informational manipulation of enrichment in both of the subjective job perception measures. Specifically, this individual difference composite accounted for an additional 8.3 percent of the variance in WIWE scores and an added 9.1 percent of the variance in ADS responses. Neither of the interactions was significant, however.

In the two instances above in which individual differences were not found to contribute significant additional variance to the prediction of subjective job perceptions, a second set of regression analyses was also performed. Specifically, the sums of squares corresponding to these individual differences were pooled into the appropriate residual terms. These residual terms were then used to retest the significance of the interaction components. The findings obtained utilizing this approach did not differ substantively from the results presented above.

DISCUSSION

The results of this study have tended to confirm that while the informational cue manipulation of enrichment contributed significantly to the prediction of subjective job perceptions, individual differences also often accounted for additional significant variance in the prediction of these incumbent perceptions. Strong, positive, significant correlations were found between the enrichment manipulation and both subjective job perception measures. In six of the eight instances in which individual differences were tested they contributed significant additional variance to the regression equations employed to predict subjective job perceptions. Given the correlations among these individual difference measures, these tests obviously were not independent of each other. It is interesting, however, that although the manipulated treatments consistently accounted for the major portion of the variance in the subjective job perception measures, as would be expected, the additional variance provided by the individual differences also appears to be practically significant, amounting to 4 percent or more of the subjective job perception variance for five of the eight individual difference measures tested. When a linear composite of these individual differences was employed, this overall summary measure accounted for an additional 8.3 percent and 9.1 percent of the variance in the two subjective job perception measures. It does not seem unreasonable that other individual differences, not included within the current investigation, might account for even more of the variance in these perceptual task measures.

Salancik and Pfeffer (1978) have argued that when characteristics are ambiguous, workers are likely to use social information in developing their task perceptions. The current data suggest that the degree to which such social information is used may vary systematically across individuals. These outcomes appear consistent with previous findings that have supported the influences of individual differences on workers' perceptions of various aspects of their jobs (Barrett et al., 1975a; Ilgen et al., 1978; Lorenzi et al. 1979; Stone, 1979). As hypothesized, field dependent participants appear to have focused more directly on socially induced informational cues than did their more field independent counterparts in formulating their subjective task perceptions. In contrast, field independent subjects seem to have been more strongly influenced by the nonenriched physical aspects of the task on which they worked.

Data relevant to the associations of both general mental ability and intrinsic work orientation with subjective task perceptions appear to support the hypotheses only partially. Individuals with higher levels of general mental ability did tend to report on the WIWE questionnaire that they perceived their jobs to be less enriched than did their lower general mental ability counterparts, but comparable results were not observed for the ADS measure of task perceptions. Similarly, an examination of Survey of Work Values to ADS associations suggests that participants with higher intrinsic work orientation tended to see the job as more enriched than did their lower intrinsic orientation counterparts. These findings, however, were not replicated when intrinsic work orientation to WIWE task perception associations were examined. In summary, although a consistent pattern of associations appears evident among measures of field independence and task perceptions, an inconsistent pattern of associations evident in the relationships is noted between the two task perception measures and both general mental ability and intrinsic work orientation. No explanation for these latter differences in association patterns across perceptual task enrichment measures is clearly evident. Such outcomes may be partially the result of differences in the nature of the perceptual task enrichment measures employed, but the consistent pattern of relations evident between both of these perceptual variables and the two field independence measures would not appear consistent with this explanation.

Finally, the prediction that the interactions of the enrichment manipulation and individual differences would account for additional variance was not well supported, with only one interaction contributing significantly to the prediction of subjective job perceptions. Further research across a wider range of task and individual difference measures would seem needed to assess the stability of the pattern of enrichment manipulation, individual difference, and interaction contributions to the prediction of subjective job perceptions observed within the current investigation.

White and Mitchell have concluded that "employee perceptions of the task environment are a joint function of objective task characteristics and social cues" (1979, p. 8). The current data extend this conclusion by indicating that individual differences also influence the degree to which workers perceive their tasks to be enriched. Naturally a precise conclusion regarding the relative contributions of informational cues from others and individual differences cannot be obtained from this single study. Informational cues had, by far, the largest impact on subjective task perceptions, but this may be because the informational cue manipulation was particularly strong or because the individual differences employed were not the most relevant to task perceptions. In addition, the present results may have been affected by the lack of a manipulation of objective task characteristics. It might be argued, for example, that such an objective manipulation would make the task situation less ambiguous and, therefore, allow subjects to rely less heavily on social cues or individual predispositions in formulating and reporting their perceptions. Prior investigations in which social cues and objective job characteristics have been simultaneously manipulated, however, also have supported the substantive effects of information from others on subjective task perceptions (O'Reilly & Caldwell, 1979; White & Mitchell, 1979; Weiss & Shaw, 1979).

The associations between individual differences and subjective task perceptions observed in the current data do not appear simply to reflect subjects' differential abilities to remember and report back the written and tape recorded informational cues provided describing their tasks. For the data to be consistent with this perspective, those with greater ability should have reported perceiving the high enrichment task as more enriched and the low enrichment task as less enriched than did their less able counterparts. Such a pattern of responses would be likely to result in significant interactions between abilities and informational cues in the prediction of perceptions. Only one such interaction was detected in the current data, however, and it was in a direction opposite to that which would be predicted if memory differences were responsible for the observed associations between individual differences and perceptions of task enrichment. Specifically, those with lower versus higher general mental ability reported the task to be more enriched in the high enrichment condition, but no ability differences in perceptions were observed in the low enrichment condition. These results appear consistent, however, with the prediction that those higher in general mental ability would be more likely to appraise critically and ignore the information provided by others when it was inconsistent with the physical task they were performing.

The findings presented above appear to have important implications for future job design work. Continued research using task perception measures may add to the understanding of the mediating process that link organizational, task, social, and individual variables with relevant work outcomes. Furthermore, those researchers and practitioners who wish to either (1) study the individual and organizational consequences of subjective task perceptions or (2) initiate intervention strategies designed to alter perceptions of task enrichment should benefit from a fuller understanding of the factors that contribute to the creation of such subjective perceptions of enrichment. In addition, however, it would seem that substantial attention should be focused on the construct validation of perceptual job enrichment measures if they are to be of value in understanding the outcomes likely to result from objective job design alterations. Similar concerns regarding the validity of perceptual measures have been expressed by investigators working in other areas of behavioral research. Sims, in discussing the use of questionnaires in leadership research, has argued that "we must have greater confidence that these inferred measures of subjective reality are indeed firmly based in objective reality'' (1978, p. 17). It may be that certain perceptual enrichment measures are less susceptible to the influences of informational cues and individual differences than others. It would seem, therefore, that any perceptual measure that is to be used as the central focus during future job design research should be first validated in a manner that demonstrates that it appropriately measures the objective enrichment constructs of interest and is not overly influenced by other factors such as informational cues and individual differences.

The development of an accurate understanding of the degree to which objective properties of tasks influence perceptual, behavioral, and affective reactions to work should also be aided by the more frequent use of experimental manipulations and objective task measures (e.g., cycle time, number of operations performed) as the independent variables in future job design research. The number of experimental job design investigations conducted to date that examine the relationships between objective task characteristics and work outcomes has been limited (Umstot et al., 1976). As a result, present knowledge of the consequences of varying amounts of job enrichment is based primarily on survey investigations that have used perceptual measures. This seems unfortunate because the patterns of findings within studies employing perceptual versus nonperceptual measures of task characteristics have not always been similar. Studies using perceptual measures, for example, typically have failed to provide consistent support for the hypothesized moderating influence of individual differences on job enrichment to work outcome associations. The vast majority of the studies reviewed by White (1978) used perceptual measures of task enrichment. Based on this literature, White (1978) has concluded that individual difference moderating effects typically do not exist within the job design field, and that research investigating this problem area should, therefore, be discontinued. Evidence from two relevant investigations that used nonperceptual task measures, however, do not support these conclusions. Data reported by both O'Reilly (1977) and Robey (1974) suggest that individual differences do moderate job enrichment to work outcome associations. Such differences in findings may be due, in part, to the confounding influences of informational cues from others and individual differences within perceptual task measures.

In summary, previous papers have argued that subjective job perceptions may well confound objective task characteristics with informational cues and individual differences, thereby providing little information on how actual job characteristics should be manipulated in the future. The current manuscript provides empirical support for these arguments and reaffirms the need for both more objective measures of task enrichment and further experimental assessments of the impacts of job design programs.

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A Comparison of the Relationships Between Subordinates' Perceptions of Supervisory Behavior and Measures of Subordinates' Job Satisfaction for Male and Female Leaders

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A sex-role congruency hypothesis concerning the relationship between subordinates' perceptions of leaders' behavior and subordinates' job satisfaction was tested in a public assistance and social service agency. Little evidence was found for the presence of a differential relationship between subordinates' perceptions of male and female leaders' behavior and subordinates' job satisfaction. Among other findings, the relationships between subordinates' perceptions of leaders' initiating structure and subordinates' job satisfaction varied among job classifications.

Reviews by Terborg (1977) and Schein (1978) have emphasized the lack of consistent results in tests of the predictions of a sex-role congruency hypothesis concerning the relationships between leader behavior and subordinate work-related attitudes. The sex-role congruency hypothesis as espoused by Schein (1975) posits that leader behavior consistent with sex-role stereotypes should be more positively related to subordinates' satisfaction than inconsistent behaviors. Specifically, the hypotheses tested most frequently have been: (1) considerate behavior, being more consistent with female stereotypical behavior, should be more positively associated with subordinates' satisfaction for female leaders than for male leaders; and (2) initiating structure behavior, believed to be more stereotypically male, should be more positively associated with subordinates' satisfaction for male leaders than for female leaders.

Both laboratory and field studies have been used to investigate the sex-role congruency hypothesis. In examining the lab studies (Bartol & Butterfield, 1976; Rosen & Jerdee, 1973) one finds some support for the hypothesis. However, these lab studies have been criticized because they lack external validity. Terborg (1977), for example, points out that stereotypes may be more operational in lab settings because the manipulated variable of sex may be one of the few bits of information that the subject can use to make a discrimination. Subsequently, in the absence of personal knowledge about the hypothetical leader, the experimental subjects may revert to the use of traditional sex-role stereotypes.

In examining field studies of the sex-role congruency hypothesis one finds inconsistent results. Petty and Lee (1975) conducted a study with nonacademic employees in a medium-sized southern university. Some support was provided for the sex-role congruency hypothesis as female leaders' consideration was more positively related to work satisfaction than was male leaders' consideration. This study also found female leaders' initiating structure to be strongly, negatively related to male subordinates' satisfaction with supervision. In a later study of professional level subordinates of county directors in a state public welfare system, stronger support was provided for the sex-role congruency hypothesis (Petty & Miles, 1976). Male leaders' initiating structure was more positively related to subordinates' satisfaction with supervision than was female leaders' initiating structure, but female leaders' consideration was more positively related to satisfaction with supervision than was male leaders' consideration. However, neither of these two studies controlled for subordinates' demographic characteristics (age, education, tenure with the agency, tenure with supervisor, etc.), which may have confounded the results.

In another field study (Osborn & Vicars, 1976) there was an attempt to control for demographic variables that might be related to sex of the supervisor. In this study employees of mental health organizations described their supervisors' behavior (initiating structure and consideration), completed a job satisfaction scale, and answered demographic questions. Although controlling for employee sex, leader and subordinate demographics, and the shared variance with the other leadership style measure, Osborn and Vicars found virtually no support for the sex-role congruency hypothesis. However, in this study as well as the other field studies, the effects of supervisors' sex *and* subordinates' sex were not adequately explored because of small sample sizes.

It also should be noted that none of these field studies controlled for role stress variables which have been found to moderate the relationships between leaders' behavior and subordinates' satisfaction (Schriesheim & Murphy, 1976). If uncontrolled role stress and demographic variables are related to the sex of the leader, they may differentially affect relationships between male and female leaders' behavior and subordinates' work-related outcomes. Subsequently, researchers may be led to conclude erroneously that the sex-role congruency hypothesis has merit.

The purpose of the present study was to test the sex-role congruency hypothesis with a larger sample ($N=2{,}432$) while controlling for subordinate demographics, job type, and role stress perceptions. Two specific research hypotheses were tested:

Hypothesis 1: Considerate supervisory behavior by female leaders will be more positively correlated with subordinates' satisfaction than will considerate supervisory behavior by male leaders.

Hypothesis 2: Initiating structure behavior by male leaders will be more positively correlated with subordinates' satisfaction than will initiating structure behavior by female leaders.

METHOD

Procedure

The present study was part of a larger study that was designed to evaluate the effectiveness of employee training in one state supervised, county-administered financial assistance and social service agency. A questionnaire and a letter from the Commissioner of the agency explaining the nature of the study and requesting the voluntary completion of the questionnaire was distributed to employees in the state office through the internal mailing system. Employees in the district and county offices received their questionnaires and the Commissioner's letter from their district or county director. Each director was given sufficient copies of the questionnaire for their employees at meetings held in each of the six district offices. Time was taken by the researchers during these meetings to explain the nature of the study as well as to provide assurances regarding the confidentiality of responses. Each employee was asked to return the completed questionnaire by mailing it directly to the researchers in postage-paid envelopes. Approximately eight weeks were provided to complete the questionnaire.

Subjects

Questionnaires totaling 4,260 were distributed to agency employees. Of these, 2,625 were completed and returned, but 193 returned questionnaires were not used in the present study because of missing demographic data. The respondent sample was predominantly female (82 percent), young (53 percent were less than 31 years old), and highly educated (55 percent had at least a four-year college degree). The personnel division of the agency reported that these figures were representative of the total agency population. Estimates were also made of the participation rates within each job category. These figures were all over 50 percent and were fairly evenly spread across all job classifications.

Measures

Job Satisfaction—Job satisfaction was measured by the Job Description Index (JDI) developed by Smith, Kendall, and Hulin (1969). The satisfaction scales for work and supervision were included in this study.

Leader Behavior—A sample of 25 items was taken from the Supervisory Behavior Description Questionnaire (Fleishman, 1972) and Form XII of the Leader Behavior Description Questionnaire (Stogdill, 1963). A factor analysis with varimax rotation (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975) was conducted on the 25 items because previous assignments of these items to scales have been criticized (Schriesheim, House, & Kerr, 1976). Based on this analysis, 21 of the items were included in the present study—11 consideration items and 10 initiating structure items. (The factor loadings and scale assignment of the leadership items are available upon request from the senior author.) The internal reliabilities (coefficient alphas) of the scales were .86 for consideration and .79 for initiating structure. The correlations between consideration and initiating structure by supervisors' sex and subordinates' job category ranged from .18 to .35 for male supervisors and .20 to .39 for female supervisors. The correlations did not vary significantly between male and female leaders.

Role Stress—Role conflict and role ambiguity scales both contained six items. Of these 12 items, 8 were developed by Rizzo, House, and Lirtzman (1970). The other four items were developed specifically for the present study. The internal reliabilities (coefficient alphas) of the scales were .78 for role conflict and .75 for role ambiguity.

Subordinates' Demographics—The respondents also provided information on their job classification, age, education, sex, tenure with the agency, tenure with their present supervisor, and their supervisors' sex. Age, tenure with the agency, tenure with the supervisor, and education were treated as covariates in the present study because they have been found to be correlated with job attitudes in previous studies (Gibson & Klein, 1970; Altimus & Tersine, 1973; Cashman, 1975; Quinn & Staines, 1978).

RESULTS

The research hypotheses were explored by testing the significance of the difference of correlations between leader behavior and subordinate-based criteria for male and female leaders while controlling for subordinates' sex. Separate analyses were performed for each subordinate job classification (clerical workers, public assistance technicians, social service workers, first line supervisors, professional/technical support staff, and managers/administrators). Partial correlations were used to test the research hypotheses when significant differences ($p < .05$) existed between male and female supervisors on leader behavior, subordinates' demographic variables (age, education, tenure with agency, and tenure with present supervisor), or subordinates' perception of role stress (role conflict and role ambiguity).

Failure to control for these significant differences could have confounded the results because the correlations between leader behavior and the criteria for male and female leaders would have been based on different distributions of the predictors and criteria.

A comparison of mean scores of leaders' behavior, subordinates' satisfaction, and subordinates' role stress by supervisors' sex within job classifications indicated that female leaders exhibited higher levels of consideration than did male leaders in the following job classifications: clerical workers ($p<.01$), first line supervisors ($p<.01$), and professional/technical support staff ($p<.01$). Subordinates of female leaders in these same three job classifications also reported higher levels ($p<.01$) of satisfaction with supervision than did the subordinates of male leaders. Clerical workers who were subordinates of male leaders also reported higher levels of role conflict ($p<.05$) and role ambiguity ($p<.01$) than did the clerical workers who were subordinates of female leaders.

A comparison of subordinates' demographic characteristics (age, education, tenure with agency, and tenure with supervisor) by supervisors' sex

TABLE 1

Relationships Between Leaders' Consideration Behavior and Subordinates' Outcomes by Sex of Supervisor, Sex of Subordinate, and Subordinates' Job Classification

		Sex of Supervisor			
		Male	*Female*	*Male*	*Female*
		Sex of Subordinate			
Job Classification	*Criterion*	*Female*	*Female*	*Male*	*Male*
Clerical workers[d]		$N=103$	$N=490$	$N=3$[c]	$N=3$[c]
	Satisfaction/work	.08	.21**		
	Satisfaction/supervision	.66**	.63**		
Public assistance technicians		$N=92$	$N=369$	$N=41$	$N=108$
	Satisfaction/work	.22	.27**	.28*	.09
	Satisfaction/supervision	.57** [a]	.83**	.69**	.76**
Social service workers[e]		$N=92$	$N=568$	$N=4$[c]	$N=90$
	Satisfaction/work	.41** [b]	.20**		.28**
	Satisfaction/supervision	.84**	.63**		.72**
First line supervisors[f]		$N=77$	$N=78$	$N=16$	$N=13$
	Satisfaction/work	.27**	.34**	.00	.39
	Satisfaction/supervision	.70**	.72**	.81**	.87**
Professional technical support staff		$N=45$	$N=59$	$N=75$	$N=29$
	Satisfaction/work	.57** [b]	.12	.51**	.25
	Satisfaction/supervision	.87** [b]	.70**	.81**	.73**
Managers/administrators		$N=29$	$N=32$	$N=42$	$N=12$
	Satisfaction/work	.24	.49**	.13	.40
	Satisfaction/supervision	.85**	.88**	.75**	.83*

[a] These two correlations are significantly different ($p<.01$) and are in the direction specified by Hypothesis 1.

[b] These two correlations are significantly different ($p<.01$) and are opposite to the direction specified by Hypothesis 1.

[c] Correlations are not reported for subgroups with an $N<10$.

[d] Role conflict and role ambiguity were partialled out for this classification.

[e] Tenure in the agency was partialled out for this classification.

[f] Time with the supervisor was partialled out for this classification.

*$p<.05$

**$p<.01$

did not yield any significant differences for subordinates' age or education. However, subordinates of female leaders in one job classification, first line supervisors, reported having significantly more tenure with the supervisor than did subordinates of male leaders ($p < .05$). The only job classification within which there was a significant difference in tenure with the agency was social service workers, in which category subordinates of females had significantly more tenure with the agency than did subordinates of males ($p < .01$).

The tests of Hypothesis 1 may be found in Table 1. An analysis of the data in this table indicates that only 1 of 20 pairs of correlations was significantly different and in the predicted direction. This one instance of support was found among public assistance technicians: female leaders' consideration was more positively correlated with satisfaction with supervision than was male leaders' consideration. It also was noted that 3 of the 20 pairs of correlations were significant and in the opposite direction to that predicted by Hypothesis 1. All of these latter differences were found among female subordinates whose male leaders' consideration was more positively correlated with subordinates' job satisfaction than was female leaders' consideration.

TABLE 2
Relationships Between Leaders' Initiating Structure Behavior and Subordinates' Outcomes by Sex of Supervisor, Sex of Subordinate, and Subordinates' Job Classification

		Sex of Supervisor			
		Male	*Female*	*Male*	*Female*
		Sex of Subordinate			
Job Classification	*Criterion*	*Female*	*Female*	*Male*	*Male*
Clerical workers[b]		$N=103$	$N=490$	$N=3$[a]	$N=3$[a]
	Satisfaction/work	−.05	−.08		
	Satisfaction/supervision	.04	.01		
Public assistance technicians		$N=92$	$N=369$	$N=41$	$N=108$
	Satisfaction/work	.08	.07	.13	.33**
	Satisfaction/supervision	.34**	.32**	.41**	.31**
Social service workers[c]		$N=44$	$N=568$	$N=4$[a]	$N=90$
	Satisfaction/work	−.04	−.20**		.17
	Satisfaction/supervision	.47**	.29**		.33**
First line supervisors[d]		$N=77$	$N=78$	$N=16$	$N=13$
	Satisfaction/work	.05	−.07	−.15	−.09
	Satisfaction/supervision	.31**	.16	.09	.32
Professional technical support staff[e]		$N=45$	$N=59$	$N=75$	$N=29$
	Satisfaction/work	−.14	−.24*	−.01	−.32*
	Satisfaction/supervision	.27*	.13	.29**	.16
Managers/administrators		$N=29$	$N=32$	$N=42$	$N=12$
	Satisfaction/work	.08	.04	.15	.00
	Satisfaction/supervision	.26	.32*	.27*	.56*

[a] Correlations are not reported for subgroups with an $N < .10$.
[b] Role conflict, role ambiguity, and consideration were partialled out for this classification.
[c] Tenure in the agency was partialled out for this classification.
[d] Time with supervisor and consideration were partialled out for this classification.
[e] Consideration was partialled out for this classification.
*$p < .05$
**$p < .01$

The analysis of Hypothesis 2 regarding structure may be found in Table 2. This table indicates that none of the 20 pairs of correlations was significantly different and in the predicted direction.

DISCUSSION

The data in the present study do not provide support for the sex-role congruency hypothesis as it pertains to leaders' consideration or initiating structure. As a matter of fact, male and female leaders' consideration were both strongly, positively correlated with male and female subordinates' satisfaction with supervision in all subgroups for all job classifications. In addition, leaders' consideration was found to be significantly, positively related to subordinates' work satisfaction in at least one subgroup in all six job classifications. Thus, in the present study, consideration was effective for both male and female leaders. Although not as strong or consistent as consideration, initiating structure also appeared to be effective for both male and female leaders as it was moderately, positively correlated with subordinates' satisfaction with supervision in 13 of the 21 subgroups.

It also was noted, however, that in three of the six job classifications subordinates of female supervisors perceived significantly more supervisory consideration than did the subordinates of male supervisors. Thus, female supervisors of clerical workers, first line supervisors, and professional/technical support staff appeared to behave consistently with the female sex role stereotype (i.e., they displayed more consideration than did male supervisors).

There could be several reasons for the lack of support for the sex-role congruency hypothesis in the present study. First, organizational factors, such as organizational stability, could have overwhelmed any differential relationships between subordinates' outcomes and supervisors' behavior that might have existed between male and female leaders. For example, two studies that have provided support for the sex role congruency hypothesis were conducted in settings in which leadership and fiscal resources were secure (Petty & Lee, 1975; Petty & Miles, 1976). In the present study the organizational climate was turbulent because of insufficient funding, recent changes in leadership, and public criticism of the organization. Subsequently, subordinates' needs for supervisory consideration and initiating structure may have taken precedence over any stereotypical considerations.

A second explanation revolves around the use of partial correlation analysis in the present study. It could be that partialling out consideration from the initiating structure-satisfaction relationships restricted the variance in the residual satisfaction measures to such an extent that significant initiating structure-satisfaction relationships were difficult to uncover for subordinates of males or females. Support for this supposition is provided by the fact that in the three job classifications for which consideration was held constant, only 3 of the 10 initiating structure-satisfaction with supervision correlations were significant ($p < .05$), but 10 of the 11 initiating structure-satisfaction with supervision correlations were significant ($p < .05$) in the job classifications for which consideration was not held constant.

However, even when consideration was free to vary, there was no evidence of a differential relationship between initiating structure and the satisfaction measures for subordinates of male and female supervisors. Failure to use partial correlation analysis in the present study could have resulted in artifactual support for the sex-role congruency hypothesis. For example, if subordinates of males were working in a more stressful environment (e.g., experiencing more role conflict and role ambiguity than subordinates of females), one would expect the initiating structure–satisfaction relationship to be stronger for subordinates of males than for females (House, 1971; Kerr, Schriesheim, Murphy, & Stogdill, 1974), a finding that would *appear* to be consistent with the predictions of the sex-role congruency hypothesis. Thus, the use of partial correlation analysis in the present study was an attempt to apply statistical control in a field study for which experimental control was impossible. The trade-off with this approach, however, is a more conservative, less powerful test of the research hypothesis.

A third explanation involves the characteristics of the individual members of the organization. The present study was conducted in a public welfare agency, one of the few types of organizations in which females have had significant experience in managerial roles. As the members of organizations gain experience with persons out of traditional sex-roles there could be a breakdown of initial stereotypic attributions about these persons. Thus, the possibility remains that the sex-role congruency hypothesis would be supported in some private sector organizations in which employees have had less experience working out of traditional sex-role relationships.

All of these explanations could be considered directions for future research. They should be pursued before any obituary is written for the sex-role congruency hypothesis.

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Job Attitudes and Organizational Performance Under Employee Ownership[1]

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This paper assesses the apparent effects on job attitudes and organizational performance of recent conversions to employee ownership at three firms. Favorable effects were most evident at the firm with the highest employee ownership and least evident at the firm with the lowest. The concept of employee participation in decision making is believed to play a key role in these outcomes.

North America currently is experiencing a resurgence of interest in and formation of business enterprises that are completely or partly owned by their employees. However, although proponents view employee ownership as a potential solution to problems of worker alienation, industrial conflict, and declining productivity, which they see as afflicting current industrial society (Vanek, 1975; Derrick & Phipps, 1969), very little empirical attention has been directed at the question of whether and, if so, how employee ownership affects job attitudes, work behavior, and organizational effectiveness. Conte and Tannenbaum have particularly noted the need for "detailed, longitudinal study of a number of companies over a period of years" (1978, p. 27).

This paper presents the results of research at three firms which quite recently have converted to employee ownership but which have varying degrees of employee ownership. There are two major objectives in this research: first, to ascertain the apparent effects of the conversions on variables such as job attitudes and organizational performance at each firm and, second, to determine whether the hypothesized favorable effects vary with the degree of employee ownership (EO) at each firm, as proponents would argue. A third objective is to explore for and identify specific factors that may moderate the effects of employee ownership.

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METHOD

Independent and Dependent Variables

Relevant dependent variables are identified through the use of a conceptual framework, explicated more fully elsewhere (Long, 1977, 1978a), that suggests that employee ownership operates by first affecting organizational identification, viewed as three interrelated phenomena (Patchen, 1970; Rotondi, 1975): (a) feelings of shared characteristics and common goals, (b) feelings of "belongingness" or solidarity with the organization, and (c) support of the organization or loyalty. These are labelled, respectively, organizational integration, organizational involvement, and organizational commitment. Integration, the belief that good organizational performance will result in a reward to the individual, is expected to produce a favorable attitude toward performance (motivation) both directly by enhancing the performance-reward contingency and indirectly through favorably influencing work group norms. "Feelings of solidarity" (involvement) are expected to enhance perceptions of interdependencies and, in conjunction with integration, lead to cooperative behaviors. Feelings of involvement also may lead to greater general satisfaction by satisfying certain social and ego needs. Finally, commitment is expected to lead to various behaviors supporting the organization, such as decreased turnover, absenteeism, and grievances, increased willingness to innovate, and the like.

All of these factors are expected to contribute to improved organizational effectiveness, but there are variables that may moderate these effects. For example, for motivation to occur, the individual must believe that his individual job performance will appreciably affect organizational performance. Similarly, for increased job effort to result from increased motivation, an individual must believe that the situation is not structured in such a way that increased job effort will not lead to improved performance (as in an assembly line). There also are many other contextual factors that may moderate the effects of employee ownership, such as the nature and size of the firm.

The definition of the independent variable is problematic because no generally accepted operational definition is available, although the model cited above does make several assumptions about the nature of employee ownership. Ownership is conceptualized in terms of private, not social, ownership with some financial investment by the individual required. It assumes that this ownership is direct, not, for example, through a trust, and that all employee stock is common (voting) stock, but it is not explicit about the amount or degree of ownership necessary to bring forth the predicted results.

At least two basic dimensions are necessary to define EO: (a) the degree to which ownership is held within the organization and (b) the extent to which all employees participate in this ownership. Many would argue that a third dimension is also necessary: the extent to which ownership is distributed *equally* across employee owners. Utilizing the first two dimensions only, a "pure case" of EO would involve ownership of 100 percent of the firm's stock by employees, with all employees sharing in this ownership, but would allow a concentration of most stock in the hands of one or a few individuals. This is clearly *not* what proponents have in mind, and it necessitates the third dimension.

However, a "pure" definition is of little use in a practical sense. Virtually none of the firms in North America experimenting with this concept satisfy this definition, but they are substantially different from conventional business organizations. It seems inconceivable that at least some of the consequences predicted by the conceptual framework would not apply to these organizations, and that employee ownership is more appropriately conceptualized as a continuous, rather than a discrete, variable.

Unfortunately, there are major problems in doing so, primarily because of the multidimensional nature of the concept. For example, for the purposes of the conceptual framework, is a situation in which 80 percent of the company stock is held within the company and 50 percent of the employees hold this stock to be considered more or less "employee ownership" than a situation in which 50 percent of the stock is held within the company and 80 percent of the employees participate in this ownership? What about a situation in which 100 percent of the stock is held within the company by 100 percent of the employees, but a small number hold the bulk of these shares, in comparison to a situation in which 70 percent of the shares is held within the company by 70 percent of the employees, who all have relatively equal amounts? Other plausible questions would be whether the effects of EO vary with the proportion of the company owned by the average employee owner or with the dollar amount of the investment, and whether and how various procedural characteristics of the ownership system affect the results obtained. These are very important practical questions, but there are no a priori grounds on which to answer them.

If some working definition of the concept is deemed practical, the following rather arbitrary minimum criteria have been proposed by Long (1977): Employee ownership occurs when (a) the majority of voting stock is owned by current company employees, (b) ownership is broadly distributed throughout the firm's employees (at least 30 percent of the employees own stock) and (c) no employee group is systematically excluded from ownership.

Finally, in assessing the effects of employee ownership, it is important to recognize that two conceptually separate phenomena may bear on the same dependent variables. Increased employee influence or participation in decision making (PDM), which also is believed to have beneficial effects on job attitudes and productivity, often accompanies employee ownership. Indeed, it has been argued that because EO may actually bring about increased PDM (Long, 1979), then EO may lead indirectly to beneficial consequences additional to the direct effects discussed earlier. Long

(1978b) has empirically shown that both individual share ownership and PDM can have independent effects on a number of key job attitudes, with participation having a relatively stronger effect. Thus, in assessing effects of the conversion, it is crucial to examine the extent to which conversion to employee ownership may have increased employee participation.

Data Collection and Research Sites

The apparent effects of conversion to employee ownership on job attitudes and organizational performance are assessed at three companies: a medium sized regional trucking firm located in western Canada, a knitting mill located in the northeastern United States, and a firm manufacturing library furniture, also located in the northeastern United States. They are relatively similar in size, employing about 165, 120, and 200 persons, respectively, and the trucking company and the furniture firm are unionized.

Data Collection—Data collection was carried out under the "holistic research approach" advocated by Dachler and Wilpert, who argue that utilization of other approaches for the study of certain complex social phenomena "may focus research questions too early on certain components of a given phenomenon" (1978, p. 35). Thus, data collection at all three firms involved field observation, interview techniques, and collection of objective data for periods prior to and subsequent to employee purchase, in addition to utilization of questionnaires. Among the specific dependent variables for which data were collected were job attitudes such as organizational identification, job satisfaction and motivation, and characteristics such as patterns of participation and influence, group norms, cooperation, turnover and grievance rates, worker productivity measures, waste and scrap losses, and changes in stock price and profitability.

Intensive study of each firm began within a few months of employee purchase and continued until at least two years after employee purchase. Unstructured interviews soliciting opinions on the effects of the conversion were conducted at various intervals with members of management, a random sampling of nonmanagers, and with relevant union officials where appropriate. Comprehensive questionnaires were administered at each firm on at least two occasions. At the trucking company and the knitting mill questionnaires were identical in terms of design and most items. They were first administered six to eight months after employee purchase, and then again one year later, to check for stability of responses and possible time effects. Two major types of questions were used, with one type asking respondents to report their current attitudes and perceptions, and the second type asking them to report their beliefs about changes in job attitudes and other characteristics during the previous year. In both cases Likert-type items were used. The questionnaire utilized at the furniture firm differed somewhat but tapped similar variables.

At the knitting mill and furniture firm questionnaires were administered by the researchers to small groups of employees on the company premises, a procedure which resulted in responses from more than 90 percent of workers and managers. Conditions at the trucking firm caused some alteration to this approach, with head office clerical and administrative employees receiving questionnaires from the researcher in small groups, and operating employees and those at other locations receiving them through the mail. Both groups had instructions to mail them directly to the researcher. This procedure resulted in a response of slightly over 50 percent. Several procedures then were undertaken to determine whether this constituted a representative sample, and no evidence was found to indicate that it did not. Nonetheless, the reader should be cautioned against placing excessive reliance on the questionnaire data only. Further detail on data collection at each firm is available as follows: (a) the trucking company (Long, 1977), (b) the knitting mill (Gurdon, 1978), and (c) the furniture firm (Hammer, 1978).

Research Sites—Although employee ownership at all three of the firms developed within the past two or three years as a result of divestitures by larger corporations, the ownership structure is quite different at each. The trucking company is wholly employee owned, the knitting mill is largely employee-owned (70 percent), and the furniture firm is partly employee owned (34 percent) and partly community owned. Within each firm, the proportion of employees (workers and managers) who owned some company stock at the outset was 70 percent, 60 percent, and 87 percent, respectively. However, due to a rapid growth in employment at the knitting mill, this proportion declined to about 30 percent within several months after employee purchase. Of the stock held by organization members, 45 percent was held by nonmanagers at the trucking company, 15 percent by nonmanagers at the knitting mill, and 65 percent by nonmanagers at the

TABLE 1

Summary of Selected Characteristics of Each Firm

	Trucking Company	*Knitting Mill*	*Furniture Firm*
	%	%	%
A. Ownership structure			
Proportion of shares held within firm	100	70	34
Proportion of employees owning stock	70	30	87
Proportion of internal stock held by nonmanagers	45	15	65
Proportion of total company stock held by nonmanagers	45	9.5	22
Average proportion of total stock held by nonmanagerial shareholders	.52	.43	.14
Proportion of nonmanagers holding stock	62	25	80
B. Other characteristics			
Number of employees	165	120	200
Unionized	Yes	No	Yes
Community size	Large[a]	Small	Small
Local unemployment rate	5-6%	13%	13%

[a] Head office located in large city, other branches in small communities.

furniture firm. Thus, at each firm, nonmanagers held 45 percent, 9.5 percent and 22.1 percent of total company stock, resulting in an average holding by each nonmanagerial employee-owner of .52 percent, .43 percent, and .14 percent, respectively. The *proportion* of nonmanagers who owned company stock in each instance was about 62 percent, 25 percent, and 80 percent. Table 1 summarizes these and other characteristics of each firm.

The three firms can thus be arranged on a rough continuum on the ownership dimension, with the trucking company closest to the ideal, followed at some distance by the knitting mill, and then the furniture firm. The furniture firm, in fact, technically does not meet the criteria proposed by Long (1977) for classification as an employee owned firm, because employees do not hold a majority interest in the firm.

There also are significant variations in stock purchase and trading procedures across the three firms. Stock ownership procedures are most regularized and restrictive at the trucking company. Nonemployees are not permitted to purchase or retain company stock. An elaborate set of procedures designed to prevent stock from eventually concentrating in the hands of a few individuals or groups also is in effect. Limits are placed on the number of shares that any individual in a given group may hold, and employees holding little or no stock are given first opportunity to purchase stock when it becomes available. All stock carries voting (one vote per share) and profit rights. Stock prices are established every two months by the company treasurer, based on a formula that considers asset value, financial performance, and seasonal fluctuations. The company treasurer also acts as an agent to facilitate transfer of stock from sellers to buyers, and regulates buying and selling in the light of the procedures described above.

Stock trading procedures are generally less regularized and restrictive at the other two firms. Nonemployees are permitted to purchase and retain company shares, although the knitting mill is attempting to discourage this. There are no restrictions on buying or selling of stock at the furniture firm, except that shares must be traded through a bank at a price that was fixed when the stock was issued. This stock does not provide dividends, but after two years may be traded at "market" value. Market forces set the price of the stock at the knitting mill. At both firms voting is based on one vote per share of stock.

There are also substantial differences in participation and control structures at the three firms. The nine-member board of directors at the trucking company is composed of two outside members, three senior managers, two truck drivers, and one member each from middle and junior management. The seven-member board at the knitting mill consists of two outside directors, senior management, and one nonmanager. The board of directors at the furniture firm is composed of outsiders and several senior managers. Board meetings are held monthly at the trucking company and about four to five times a year at the furniture firm and the knitting mill.

Trucking company shareholders receive a monthly profit and loss statement and report from the president, and all board members receive a complete set of financial statements prior to each monthly meeting. At the knitting mill no regularized system for communicating with employee-owners has been established. At the furniture firm a newsletter is published.

Overall, these objective factors suggest that employee participation in decision making may have increased to a greater extent at the trucking company than at the other two firms. This is corroborated by questionnaire and interview data, which indicated that at the trucking company worker participation in job, departmental, and organizational policy decisions has increased since employee ownership (Long, 1979). At the knitting mill worker influence has increased only slightly, mainly at the organizational policy level, and the furniture firm showed little or no change. As would be expected, questionnaire data also indicated higher absolute levels of participation subsequent to employee purchase at the trucking firm, in comparison to the knitting mill. Data for the furniture firm were unavailable.

Several other differences among the three firms also exist and might be important in interpreting the findings. The furniture firm and the knitting mill are both located in a similar geographical locale, depressed economically (an unemployment rate in excess of 13 percent). The trucking company was located in a much more prosperous area (unemployment of about 5 percent-6 percent). The furniture firm and knitting mill were located in small towns and employed long-time residents, who generally had long periods of service with the company and few alternatives to employment with their present firms. The converse was generally true at the trucking firm, which also had a somewhat younger work force.

FINDINGS AND DISCUSSION

Expectations, then, were that the effects of conversion to employee ownership would be generally favorable, and would be most apparent at the trucking company and least apparent at the furniture firm, with the knitting mill falling somewhere between the two. In fact, the pattern indicated by a wide variety of data seemed to support this, as summarized in Table 2.

At the trucking company, first wave questionnaire data (nonmanagerial respondents only) indicated that respondents believed increases in general satisfaction, job effort, productive work, and communication between management and employees had taken place subsequent to employee purchase. In interviews, employees reported more conscientious work behavior and higher levels of cooperation, and they confirmed the increased satisfaction indicated by the questionnaires. There also was evidence of favorable group norms being enforced, as, in the words of a clerical employee (a nonstockholder), "every worker is looking to see if fellow

TABLE 2
Tabular Summary of Findings

	Trucking Company	*Knitting Mill*	*Furniture Firm*
Degree of employee ownership	High	Moderate to low	Low
Change in traditional influence relationships	Moderate	Moderate to low	Low
Job attitudes	Considerable improvement	Some improvement	Little change
Turnover	Down	Down	Little change
Grievance rates	Down sharply	N/A	No decline
Worker performance	Up	Up	N/A
Profitability	Up sharply	Up sharply	Up somewhat
Share price	Up 300%	Up 252%	Cannot change

N/A = Not applicable or not available.

workers are doing their jobs." Interviews also supported the existence of all three types of organizational identification. For example, several persons stated that, in the words of a driver, "everyone works together because we all have the same goal" (integration). Several employees reported, in the words of a clerical employee, "a feeling of pride and importance among employees" (involvement) and that "stockholders tend to stay longer in their jobs than otherwise" (commitment).

Questionnaire and interview data indicated similar but weaker results at the knitting mill, but subjective data from the furniture firm indicated little appreciable change in job attitudes and employee behavior subsequent to employee purchase. The increases noted at the trucking firm were found to be quite stable one year later, as indicated by comparison of wave 1 and 2 data. This was generally true at the knitting mill as well, although some declines were noted.

Objective measures of job attitudes and organizational performance tended to corroborate these findings. First, declines in employee turnover were noted at the trucking company—where turnover declined about 30 percent—and at the knitting mill—where voluntary turnover had been quite low prior to employee purchase (possibly primarily due to poor alternative employment opportunities), about 3.9 percent annually, but did decline further to about 1.7 percent. At the furniture firm turnover was fairly low prior to employee purchase, and has not changed appreciably. It should be noted here that the decline in turnover at the trucking company took place entirely among the stockholders, who now have a turnover rate of less than one-third that of the nonshareholders.

As another behavioral measure of satisfaction, grievance rates were examined at the two unionized firms. At the trucking company, there were no grievances at all in the year following employee purchase, and one grievance the following year, in contrast to large numbers in previous years. At the furniture firm, however, union officials reported no decline from the fairly substantial rate of grievances prior to employee purchase.

Several indicators of work motivation were available at the trucking company and the knitting mill. First, the amount of customer claims for freight damaged or lost, reflecting the care displayed by freight handlers and drivers, declined by about 60 percent. This higher *quality* of output did not come at the expense of *quantity* of output—pounds loaded per man hour actually increased by about 5 percent. At the knitting mill, scrap loss dropped from about 1.5 percent of net sales to about .25 percent, although part of this may be due to installation of some new capital equipment during this period.

In terms of overall organizational performance, the financial performance of each firm has improved since employee purchase. The trucking company and the knitting mill had suffered substantial losses prior to purchase (about $500,000 over the previous two years, about $500,000 in the previous year, respectively). They have since become consistently profitable, showing significant profits in each of the two years subsequent to purchase (about $230,000 and $260,000 for the trucking company, and $256,000 and $230,000 for the knitting mill). After two years of employee ownership share prices were 300 percent of their initial levels at the trucking firm, and 252 percent at the knitting mill. The furniture firm, which had been marginally profitable prior to purchase, has also shown some increase in profitability, although the results are not as dramatic. Share prices are not allowed to fluctuate and therefore have not changed since purchase.

This evidence suggests that job attitudes and organizational performance have improved subsequent to employee purchase at the trucking company and the knitting mill, and it has been hypothesized that this is due primarily to employee ownership either directly, or indirectly, through increasing employee PDM. If employee share ownership has, in fact, contributed to favorable attitude change, then worker-owners in each company should show more favorable attitudes than nonowners. Furthermore, because the trucking company is thought to approach the "pure case" more closely than the knitting mill (and also has a higher degree of PDM), attitudes should be relatively more favorable at the trucking company.

Certain key job attitudes of both worker-owners and nonowners at the two firms are displayed in Table 3. As can be seen, worker-owners were found to be significantly higher in organizational integration, involvement, and satisfaction than nonowners at both companies, and higher in organizational commitment at the trucking firm. However, no significant differences in motivation were noted at either company.

This does not necessarily indicate that employee ownership has not increased work motivation. It has been posited that ownership might enhance motivation both directly through enhancing the performance-reward contingency and indirectly through creating favorable group work norms. This second source of motivation would apply to nonshareholders as well as the shareholders, thus diminishing the difference in motivation expected between the two. This thesis is supported by both subjective data, which indicate more favorable work norms since employee purchase,

TABLE 3
Comparison of Job Attitudes of Worker-Owners and Nonowners, Trucking Company and Knitting Mill[a]

	Trucking Company					*Knitting Mill*				
	Shareholders $n=41$		*Nonshare* $n=18$			*Shareholders* $n=22$		*Nonshare* $n=71$		
	Mean	σ	*Mean*	σ	$p<$	*Mean*	σ	*Mean*	σ	$p<$
Integration	5.32	1.16	4.42	1.22	.01	5.26	1.35	4.76	1.53	.05
Involvement	5.93	.76	4.67	1.24	.001	5.77	1.41	4.59	1.66	.005
Commitment	5.90	.94	4.78	1.59	.01	3.45	2.15	4.07	1.78	N.S.
General satisfaction	5.93	.89	5.46	.85	.05	5.19	1.29	4.49	1.56	.05
Motivation	5.36	1.02	5.20	1.15	N.S.	4.12	2.06	3.66	1.80	N.S.

[a] These data refer to responses of nonmanagers obtained on the first questionnaire administration. Variables were measured using scales consisting of Likert-type items, with a response scale of 1 (strongly disagree) to 7 (strongly agree). A higher numeric value indicates a more favorable attitude. Scale items were obtained or adapted from sources such as the Michigan Organizational Assessment Package (1975). Sample items for each scale are: (a) integration—"What is good for the company is good for me" ($\alpha=.60$); (b) involvement—"I feel that I am an important member of this firm" ($\alpha=.61$); (c) commitment—"If I were offered a similar job with another firm at a slight increase in pay, I would take it" (reverse-scored; single item scale); (d) general satisfaction—"Overall, this company is a good place to work for" ($\alpha=.66$); and (e) motivation—"Working for this firm really makes me want to try to do my job the best it can possibly be done" ($\alpha=.72$). Further details of these scales are available in Long (1977).

and objective performance data, which indicate increased job effort after employee purchase.

Comparison of a variety of job attitudes at the two firms indicated much more favorable attitudes at the trucking company, as was expected. To test whether this difference is due to the smaller proportion of employees who are owners at the knitting mill, shareholders only at both firms were compared. Worker-owners at the trucking company were found to be significantly higher in a number of attitudes, including commitment, satisfaction, and motivation. Because this procedure controls for share ownership, it is argued that this difference is due primarily to a higher level of PDM at the trucking company, which occurred concurrently with the conversion to employee ownership. This argument is supported by Long's (1978b) finding at the trucking company, that both participation in decision making and share ownership had independent and significant effects on key job attitudes.

SUMMARY AND CONCLUSION

The apparent effects of conversion to employee ownership varied considerably across the three firms, as had been expected. Although in none of the cases did negative consequences appear to result, the extent to which employee ownership was accompanied by beneficial consequences appeared to vary with the degree of ownership and the extent to which traditional patterns of employee influence and participation in decision making changed subsequent to employee purchase. The favorable results predicted by the conceptual framework were most evident at the trucking company and least evident at the furniture firm, with the knitting mill falling in between. However, although these findings are consistent with expectations, it should be noted that in any study examining interfirm differences alternative explanations for these differences are likely to be available and caution should be exercised in inferring causality.

For example, attribution theory (Kelley, 1971) may play a role in explaining the apparently greater attitude change at the trucking firm in comparison with the other two firms. Attribution theory posits that the amount of attitude change that follows some action made by an individual depends on whether the individual perceives that action to be voluntary or involuntary. Although participation in all three stock ownership plans was ostensibly voluntary, it may not have been perceived so at the knitting mill and furniture firm because alternative employment opportunities would not be readily available should their current employer not survive. Thus, less attitude change would be expected.

Overall, these results seem to point up the need to conceptualize employee ownership as a continuous variable, and to define further and clarify the variable within a multidimensional context. Empirical research needs to be directed toward identifying the independent and interactive effects of each dimension on relevant dependent variables. For example, this study seems to suggest that the proportion of stock held within the firm may be more important than the proportion of employees who own stock. Yet, there is likely a certain critical mass of employees who must own stock before significant effects can be detected. The research process to answer questions like this is made more complicated by the likelihood that many of these relationships are not linear.

Two other sets of questions are important for future research to address. First, how, and under what conditions, is employee participation in decision making related to employee ownership? The extent to which EO is able to bring about increased PDM may be the single greatest factor affecting the success of employee ownership. Second, what contextual factors moderate the relationship between ownership, job attitudes, and organizational performance? It will not be until these types of questions are empirically addressed that much help can be provided to either theoreticians or practitioners working in this area, and it is hoped that this study has helped to identify some of the specific questions that need to be answered.

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Preferential Treatment in Preselection Decisions According to Sex and Race[1]

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Resumes of fictitious applicants for entry-level professional positions were mailed to 458 potential employers, and the responses were analyzed. A three-group experimental design permitted control for differential response not due to the race and sex treatment. Preferential treatment was found in favor of blacks over whites and in favor of males over females.

Since the passage of the 1964 Civil Rights Act, the impact of equal employment opportunity legislation has been widely debated. Some assert that equal opportunity/affirmative action programs are a facade permitting all but the grossest forms of discrimination to flourish. Others argue that equal opportunity regulation results in reverse discrimination which victimizes unprotected classes of employees.

Much of the controversy is due to a fundamental misunderstanding about just what discrimination is and how equal opportunity legislation impinges on selection systems. The broadest interpretation of E.E.O.C. guidelines requires selection without regard to race, sex, color, religion, or national origin. Yet the guidelines define discrimination in terms of *differential hiring rates* between races, sexes, etc. Thus, the guidelines permit employers some discretion in the many decisions that precede the ultimate selection choice from among job applicants. Firms may "more actively" recruit women and minority group members. In other words, organizations may favor candidates of "protected class status" over others in preselection decisions as long as it serves to contribute to equitable hiring rates. Minorities and women can be extended the "courtesy" of being kept longer in the active applicant pool and of being given more opportunities to make an impression. Such preferential treatment, although legal,

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is the focus of criticism. After all, equal opportunity legislation in the broadest sense purports to make employers blind to race, sex, and other factors. To the applicant who perceives him- or herself on the short end of this preferential treatment, it smacks of reverse discrimination.

Much of the research conducted on the subject of employment discrimination has shown that stereotypic perceptions mitigate against preferential treatment on behalf of blacks and women in selection decisions (Cohen & Bunker, 1975; Dipboye, Franklin, & Wibach, 1975; Rosen & Jerdee, 1976). However, these studies have employed laboratory settings under less than realistic conditions. It remains to be seen whether minorities and women are actually given preferential treatment or whether white males are the beneficiary of stereotypical associations in actual personnel selection decisions.

This is a difficult issue to address empirically. Ideally, researchers need access to the selection process of organizations to identify the impact of equal opportunity sanctions on preselection decision rules. However, the adversary climate between many organizations and compliance agencies precludes this level of access. Newman (1978) attempted to circumvent this problem by examining the differential responses of real organizations to resumés he mailed to them representing fictitious black and white candidates with equivalent credentials. Unfortunately, Newman's effort suffers from some methodological problems that have been documented elsewhere (McIntyre, Moberg, & Posner, 1980). Thus, it remains to be seen empirically whether (and to what degree) protected class applicants are accorded preferential treatment in preselection decisions or vice versa.

METHOD

The current study was designed to answer, within a real employment environment, whether and by how much organizations do actually give favored treatment to black and female applicants in preselection decisions. The research design is based on mailing fictitious but realistic appearing resumés to actual employers and examining the pattern of their responses. In order to assess the degree of preferential treatment accorded to candidates of protected class status, each employer was sent a matched "set" of three resumés: two representing majority applicants (white males), and the other representing a minority applicant (in this case, either a black or a white female). The two majority applicants form a control group. The minority applicant provides the experimental group. The logic of this design deserves some discussion.

In a study like this, one would like to present the race or sex treatment (white versus black, male versus female) on exactly the same resumé to be sure that the response was not due to a difference among the resumes themselves. However, such an approach would lead to an unacceptable likelihood of detection by the subject employers. To avoid this problem, resumés were prepared for each job category which varied slightly with respect to format and qualifications (experience, grade point average, etc.) and which identified applicants with different ethnically bland names. Each resumé attribute was rotated to yield 81 different combinations. The treatment (race or sex) was systematically rotated so that it was exactly balanced (orthogonal) with regard to frequency of appearance on each resumé. In addition, the mailing order of each resumé was rotated so that each subject organization had an equal probability of receiving the treatment resumé first, second, or third at one week intervals.

Three safeguards serve to avoid detection, but they create interpretive problems when one compares the responses between treatments. For example, if a company responds positively to the resumé of the white applicant and negatively to the resumé of the black applicant one would not be sure if this difference was due to the race treatment or some other perceived nonequivalency of the two resumés. In addition, this response difference may occur because of inherent inconsistencies in company selection systems regarding their responses to write-in resumés in general. More precisely, nontreatment effects that might favor one applicant over the other in a two-resumé comparison may arise due to:

1. artifacts of the experiment (e.g., detection of the experiment by selection officials, responses to nonsubstantive differences between resumés designed to be equivalent, difference in the availability of relevant positions due to the time difference [7 days] between the receipt of the resumés, resumés or responses being lost in the mail, etc.), and/or
2. flaws in selection systems *independent* of the race treatment (e.g., lack of standardization in the process of assessing or responding to resumés, lack of consistency in decision rules used, lack of training or experience among selection officials, inaccurate or conflicting job specifications, misinterpretation of selection policies, etc.).

The three-resumé design permits a control for these nontreatment effects. Because each subject employer received two resumés of equal treatment (white males), any differential responses to these resumés serves as an estimate of the nontreatment effects imbedded in any black-white or male-female response comparison. Thus, if 20 percent of the companies responded differentially to the two white male resumés, one would look for differential responses to the white and black resumés statistically above the 20 percent figure. The logic of the three-resumé design, then, is to provide a control for the nontreatment effects created by the necessity of avoiding detection of the experiment.

The sample in the current study consisted of a stratified random sample of employers listed in the 1978 *College Placement Annual.* This document includes job openings from approximately 1,300 corporate and governmental employers who normally recruit college graduates. It is distributed on a nationwide basis at career planning and placement centers at two-year and four-year colleges and universities in the United States. It serves as one of the main sources of information regarding potential job openings for college students. All employers listed are on record as equal opportunity employers.

A sample size of 458 companies was chosen, based on a desire to have a 95 percent chance of rejecting the "equal treatment" null hypothesis if in fact there is as much as a 10 percent biased treatment. Based on the Newman (1978) study, the expected level of differential treatment was estimated to be about 25 percent. This would suggest an expectation of 114 observations of differential treatment in a sample of 458. If there were 10 percent incidence of favoritism (e.g., favoring the white) the 114 off-diagonal observations would fall 68 favoring white and 46 favoring black (as opposed to 57 and 57). Under this null hypothesis of equal treatment the occurrence of favoritism would be a Bernoulli process with $p = .50$. Because $P\,(r \geq 68 | p = .50,\ n = 114) < .05$, this sample size met the desired detection criterion.

For the purposes of drawing a sample, the companies were stratified both by job interest category (accounting, electrical engineering, and marketing/sales) and by geographical region (East, Midwest, and West). Firms employing less than 1,000 employees were excluded from the sample. The final selection included 458 companies about equally divided among the three job interest categories and regions.

Again, each company in the total sample received a "set" of three resumés for a single job interest category. Each set contained two white and one black applicant (a fourth resumé representing a female applicant was added to the western region only). Each resumé in the set was mailed approximately one week apart from one of three return addresses in each geographical region. Both postmarks and return addresses were within the sampled organization's appropriate geographic recruitment vicinity. Each set of resumés was also sent with systematically varied cover letters, which included both the firm's name and address and the applicant's return address. Letters were hand-signed by different individuals.

The decision regarding how to identify the applicant's race and sex on the resumé was made to avoid priming the subject employers. After conferring with local personnel directors, affirmative action officers, and college placement directors, it was learned how blacks and females identify their protected class status, if at all. It was found that black applicants often make the statement "RACE: BLACK" under the personal characteristics section of the resumé. On this basis, the black resumé included this notation, but the white resumés made no mention of race. The female resumés were differentiated from the male by an obvious woman's first name.

In summary, every reasonable effort was made to vary the resumes systematically so that the possibility of detection was minimized and any treatment effect due to race or sex could be detected over any nontreatment effects.

At the end of eight weeks after the mailing date for each candidate the results were collected and coded for each company into one of the following six categories:

1. No response: The company did not respond at all to the candidate.
2. No interest: The company responded with a letter clearly indicating that the candidate would not be considered further for possible job openings.
3. No opening file: The company responded with a letter that indicated the candidate would not be hired for a current opening, but that his/her resumé would be kept on file for consideration should other openings become available in the future.
4. Active file: The company indicated that the applicant's resumé was being distributed to different individuals within the company for further consideration and that a determination would come later.
5. Application: The company responded by mailing the candidate a job application to complete and return.
6. Interview: The company responded by asking the candidate to write or call to arrange for an interview or, in some cases, suggested an actual interview date.

These responses are taken to be ordinal indicating higher and higher interest in the candidate and, therefore, increasing probability of an ultimate interview (and subsequent job offer). From the point of view of the candidate, the ordinality of these categories seems appealing. An interview response is clearly the best, and the application gives the candidate an opportunity to offer more or new information and apparent further consideration. An active file is the next most attractive, indicating heavy consideration. The no opening file response is the next worse, but still offers a ray of hope for some possible future opening. Finally, a no interest response is clearly the worst of all responses to receive. But worse than this is no response at all, which leaves the candidate in a condition of uncertainty.

However, from the organization's viewpoint, which is the focus of this study, the ordinality of this scale may fall into greater question. For instance, does no response at all show more interest than a response of no interest? Does an application response show more interest than an active file response?

In order to assess the degree to which the indicated response scale is actually ordinal, 19 personnel managers from 8 companies were asked to rank the response categories as they would use them in responding for their company. The six alternative responses were ranked from "most favorable response" to "least favorable response." The managers in this sample were all familiar with and experienced in regularly evaluating write-in resumés as part of their job. The mean Spearman rank correlations across the personnel managers was .86, substantiating the assumed ordinality of the response scale.

In addition, certain characteristics of the company were coded in an attempt to identify factors that might be associated with the response patterns. The number of company employees at the particular location and the number of column inches of the company's advertisement in the *College Placement Annual* were recorded for each company.

Ethical Considerations

Ethical questions can be raised about the methodology in this study. Any researcher who deceives subjects must confront complicated ethical dilemmas. In this study, deception was used to elicit responses from unknowing organization respondents. Is deception like this ever warranted? Prior to undertaking this study, the authors endeavored to determine whether this research design was ethical according to current norms. The criteria chosen reflect American Psychological Association guidelines (1967). Namely, the factors considered were: (1) the potential harmful effects on the subject, (2) the importance of the study, and (3) the availability of less deceptive methodological alternatives (Kelman, 1967, 1972).

The potential harmful effects of this deception are several. First, personnel specialists in the sampled organizations may be induced into erroneous conclusions about the nature of certain labor markets. Second, the treatment of actual applicants in the selection pipeline may be adversely affected. There is also the issue of the time and effort wasted in considering fictitious applicants. The design was altered to attempt to minimize these effects. The sample parameters were adjusted to include only firms that process large numbers of write-in applicants. In addition, company responses were promptly followed up with communications that the (fictitious) candidate was no longer in the labor market.

The importance of the study was also the subject of much discussion. What emerged was a consensus that information regarding preferential treatment in preselection decisions can demonstrate whether equal opportunity sanctions act to cancel out what appear to be negative racial and sexual stereotypes in employment decisions. Moreover, evidence of preferential treatment in preselection decisions would seem to indicate imperfections in the efficiency of certain labor markets (Borjas & Goldberg, 1978).

A final consideration regarding the ethics of this study was the existence of alternative methodologies less deceptive than that envisaged. Clearly, a less deceptive method could have been used. However, questions can be raised about the accuracy of data gathered under these circumstances. In a similar context, Newman and Krzystofiak found that employment officials provided far different information in a self-report design that they did in an unobtrusive one. They concluded, "because of the sensitive nature of affirmative action data and the difficulties companies face in complying with affirmative action goals, there is little doubt that self-report data will be subject to some distortion" (1979, p. 85). In short, then, there were simply no known methodological alternatives likely to result in conclusive information given (1) the reluctance of contemporary organizations to allow their selection processes to be scrutinized and (2) the likely reactivity of subject to methods which are not deceptive.

RESULTS

The results of the study are shown in Tables 1, 2, 3, 4, and 5. Table 1 displays the cross-tabulation of company responses to the black applicant and to white applicant #1 in each set sent to the entire sample of 458 organizations. By way of explanation, note that the entry in row 2, column 6 means that 14 of the employers that sent a "no interest" letter to white applicant #1 requested an interview with the black applicant. This cell in the table, like all those above the diagonal, was taken as an instance of preferential treatment in favor of the black applicant. Similarly, those cells below the diagonal represent favoritism for the white applicant.

TABLE 1
Company Responses to the Resumés of the Black and White Applicant #1

		Company Response to Black Applicant						
		No Response	*No Interest*	*No Opening-File*	*Active File*	*Application*	*Interview*	*Total*
Company Response to White Applicant #1	No Response	66	11	6	0	2	12	97
	No Interest	10	99	4	2	7	14	136
	No Opening-File	14	2	100	0	3	6	125
	Active File	0	0	0	10	2	4	16
	Application	3	3	1	1	21	5	34
	Interview	3	4	5	4	1	33	50
	Total	96	119	116	17	36	74	458

Table 2 also permits a white-black comparison, but this time responses to the second white applicant were used as the standard. There were 78 instances of favoritism for the black (above the diagonal) in Table 1 and 94 instances of the same type of favoritism in Table 2. In contrast, there were 51 instances of preferential treatment in favor of the white (below the diagonal) in Table 1 and 52 in Table 2. The arithmetic average of the off-diagonal cases is 86 instances of black favoritism and 51.5 instances of white favoritism. Assuming a Bernoulli process, the null hypothesis of equal treatment (no response difference) was tested by calculating the probability of drawing 86 (or more) blacks from a sample of 137.5 (51.5 + 86) where the probability of drawing each black is .50. Because $P(r \geq 86 | p = .50, n = 137.5) = .0013$, the null is rejected in favor of the alternative hypothesis that the black is favored ($p < .01$).

To determine whether this result could be due to nontreatment effects rather than race, it is necessary to assess the probability of off-diagonal occurrences when two white male resumés are compared. Table 3 displays the cross-tabulation of the company responses to the two white applicants in each set sent to the entire sample. Because the two white resumés were

TABLE 2
Company Responses to the Resumés of the Black and White Applicant #2

		Company Response to Black Applicant						
		No Response	*No Interest*	*No Opening-File*	*Active File*	*Application*	*Interview*	*Total*
Company Response to White Applicant #2	No Response	66	15	6	3	2	18	110
	No Interest	8	91	6	1	7	12	125
	No Opening-File	12	3	97	0	2	9	123
	Active File	0	0	2	11	3	3	19
	Application	3	3	2	0	22	7	37
	Interview	7	7	3	2	0	25	44
	Total	96	119	116	17	36	74	458

designed to be functionally equivalent (though not identical), any off-diagonal dispersion is not due to the race treatment. What is important in Table 3 is *not* which white applicant received a more favored response pattern. Rather, an estimate is needed of the frequency with which the sampled companies yielded different responses to candidates with equal races. Accordingly, the data in Table 3 are transformed by averaging the cell frequencies in the top and bottom halves of the matrix. The result is the control matrix in Table 4. Note that averaging in this way creates symmetry above and below the diagonal.

TABLE 3
Company Responses to Equivalent White Male Resumés

		Company Response to White Applicant #1						
		No Response	*No Interest*	*No Opening-File*	*Active File*	*Application*	*Interview*	*Total*
Company Response to White Applicant #2	No Response	74	11	6	0	1	5	97
	No Interest	14	103	6	1	6	6	136
	No Opening-File	10	4	104	2	3	2	125
	Active File	1	0	1	12	1	1	16
	Application	1	5	2	2	23	1	34
	Interview	10	2	4	2	3	29	50
	Total	110	125	123	19	37	44	458

Since there are a total of 113 off-diagonal observations, the probability of differential responses (above *or* below the diagonal) to equivalent resumés is (113/2)/458 = .123. Thus, the probability that the 86 or more black favored events could occur without the race treatment is very small,

TABLE 4
Control Matrix: Average Off-Diagonal Dispersion in Table 3

		Company Response to White Applicant #1						
		No Response	No Interest	No Opening-File	Active File	Application	Interview	Total
Company Response to White Applicant #2	No Response	74	12.5	8	.5	1	7.5	103.5
	No Interest	12.5	103	5	.5	5.5	4	130.5
	No Opening-File	8	5	104	1.5	2.5	3	124
	Active File	.5	.5	1.5	12	1.5	1.5	17.5
	Application	1	5.5	2.5	1.5	23	2	35.5
	Interview	7.5	4	3	1.5	2	29	47
	Total	103.5	130.5	124	17.5	35.5	47	458

$P(r \geq 86 | q = .123,\ n = 458) < .001$. The conclusion is that the rejection of the null hypothesis of equal response is due to the race treatment.

Table 5 provides a summary of the results of similar statistical tests regarding discrimination by race in different job categories, different geographic regions, and among organizations of different sizes. Evidence regarding discrimination by sex is also shown. In each case, H_1 delineates the probability of rejecting the null hypothesis of equal treatment in favor of the alternative hypothesis that males and blacks are favored over females and whites respectively. H_c represents the probability that the favored responses are due to nontreatment effects.

The data presented in Table 5 indicate that black applicants are the beneficiary of favoritism in every region sampled except the West, in every job category sampled except those applying for electrical engineering positions, and in organizations of all sizes sampled. In addition, male write-in applicants are preferred over females. Finally, all of these results are independent of nontreatment effects.

In addition to the type of response, there may be preferential treatment bias in regard to the time taken to respond to various job applicants. The time it takes a company to respond to a write-in applicant may influence the job seeker's eventual employment decisions. With "maildays" (the number of days between mailing and receipt of a reply, excluding Sundays and holidays) defined as the dependent variable, a stepwise regression equation was derived from 1,174 returns to the individual candidates. (All of the nonresponse entries in the study are excluded from this analysis for the obvious reason that there is no meaningful measure of "time to respond" in these cases.) The independent variables included: race, sex, job interest category, geographical region, response category, company size (i.e., number of employees), distance (i.e., number of miles from the applicant's return address and company's address), and inches (i.e., number of square inches of company's advertisement in the *College Placement*

TABLE 5
Summary of Statistical Results Comparing Company Responses to Resumés by Race, Sex, Geographical Region, Job Category, and Company Size

(A) Black-White ($N=458$)	
H_1: $P(r \geq 86 \mid q=.5,\ n=138)=.0013$	$p<.01$
H_c: $P(r \geq 86 \mid q=.123,\ n=458)<.001$	$p<.001$
(B) Male-Female ($N=152$)	
H_1: $P(r \geq 54 \mid q=.5,\ n=82)=.003$	$p<.01$
H_c: $P(r \geq 54 \mid q=.141,\ n=152)<.001$	$p<.001$
(C) Black-White (East: $N=153$)	
H_1: $P(r \geq 26.5 \mid q=.5;\ n=37.5)<.001$	$p<.001$
H_c: $P(r \geq 26.5 \mid q=.095,\ n=153)=.0057$	$p<.01$
(D) Black-White (Midwest: $N=153$)	
H_1: $P(r \geq 34 \mid q=.5,\ n=53.5)=.0239$	$p<.05$
H_c: $P(r \geq 34 \mid q=.114,\ n=153)<.001$	$p<.001$
(E) Black-White (West: $N=152$)	
H_1: $P(r \geq 26 \mid q=.5,\ n=46)=.1881$	NS
H_c: Not applicable	
(F) Black-White (Accounting: $N=152$)	
H_1: $P(r \geq 29 \mid q=.5,\ n=44)=.0174$	$p<.05$
H_c: $P(r \geq 29 \mid q=.128,\ n=152)=.0102$	$p<.05$
(G) Black-White (Engineering: $N=153$)	
H_1: $P(r \geq 28.5 \mid q=.5,\ n=52.5)=.1676$	NS
H_c: Not applicable	
(H) Black-White (Marketing/Sales: $N=153$)	
H_1: $P(r \geq 29.5 \mid q=.5,\ n=40.5)=.0018$	$p<.01$
H_c: $P(r \geq 29.5 \mid q=.105,\ n=153)<.001$	$p<.001$
(I) Black-White (Company, with less than 10,000 employees: $N=252$)	
H_1: $P(r \geq 44.5 \mid q=.5,\ n=73.5)=.0351$	$p<.05$
H_c: $P(r \geq 44.5 \mid q=.121,\ N=252)=.0035$	$p<.001$
(J) Black-White (Company, with between 10,000 and 20,000 employees: $N=86$)	
H_1: $P(r \geq 13 \mid q=.5,\ n=23)=.0188$	$p<.05$
H_c: $P(r \geq 13 \mid q=.121,\ n=86)=.0035$	$p<.001$
(K) Black-White (Company, with more than 20,000 employees: $N=120$)	
H_1: $P(r \geq 28.5 \mid q=.5,\ n=41)=.0062$	$p<.01$
H_c: $P(r \geq 28.5 \mid q=.150,\ n=120)=.0036$	$p<.01$

Annual). Although the corrected R^2 was only .07 (standard error = 12.3). significant results ($p<.05$) from this analysis emerged. First, the mean time to respond to a job applicant was 14 days. Second, there was no significant difference in maildays due to race. However, there was a significant maildays difference due to sex, with responses to females taking 2.6 days longer.

DISCUSSION

It is known from court proceedings that there are some occurrences of favoritism toward minorities in nonselection *personnel* decisions—for example, Weber vs. Kaiser Aluminum—but the existence and frequency of such activity in *preselection decisions* are the significant findings of the current study. The results indicate that some firms do extend preferential treatment to blacks in preselection decisions. Although favoritism towards minorities is not inconsistent with E.E.O.C. guidelines, it does raise some interesting questions about the extent to which the guidelines make employers colorblind. Moreover, it leaves open to conjecture whether this favoritism extends to reverse discrimination in hiring. If it does, then this is contrary to E.E.O.C. guidelines. If it does not, then this gives rise to inequities as particular white applicants are deprived of an equal chance in the process and particular black applicants are led on but not hired. Such is the nature of present affirmative action sanctions, and no single study is likely to put these issues to rest.

In contrast to the ways blacks are treated in preselection decisions, females apparently have more difficulty. In the organizations sampled, men were accorded favoritism over women, and women may have suffered with regard to the promptness with which organizations processed their inquiries. Thus, although employers are permitted active recruitment of female applicants, the effects of negative stereotypes against women in professional positions apparently continue to be felt.

The different response of companies to black and female applicants might be explained in several ways. First, it might be argued that there is more "pressure" in and on organizations to recruit blacks than there is to recruit women. Some organizations may find that they meet E.E.O.C. guidelines regarding the composition of their workforce for females but not for blacks. This is probably true at the level of jobs sampled by this study (entry-level, college graduates). Second, firms also may have more experience in recruiting blacks than females. A number of women's organizations have contended, for example, that firms are neither very conscious about women's issues nor organized and prepared to deal with female applicants.

These conclusions should be taken within the context of the sampling procedures used in this study. The sample was stratified and is not globally representative. It should also be remembered that the sampled firms were those that solicit write-in applicants.

Several questions deserve attention in future empirical studies on this subject. First, the estimate of nontreatment effects of .12 found in the white-white response comparison indicates that there is some differential response accorded to resumés designed to be equivalent. This may be an artifact of the experiment, but it may indicate that there is some inconsistency in selection processes or lack of standardization in selection decision rules. Efforts to partial out these effects may enable researchers to establish whether selection systems should be "tightened up" to avoid inconsistencies and bias where it is not intended.

Second, studies should address the issue of how the nature of selection systems impacts on the decision processes and outcomes of job applicants. For example, write-in job seekers may place more hope on active file response than warranted. In addition, the response time may be taken by candidates as information about a company's interest in them when it was not intended as a signal by a company. Finally, those selection officials who fail to respond at all to write-in applicants may not realize the impact that this has on the candidates' career decisions or on their attitudes toward that firm. It is informative that more than one organization in four failed to respond to the fictitious candidates in any way.

Finally, there is the need to discover the impact of compliance agency vigilance on selection systems in general and race and sex discrimination in particular. For example, do firms with a history of E.E.O.C. complaints respond any differently to write-ins than companies that have escaped complaint? Is the impact of E.E.O.C. complaints to delay or to increase response time to write-in applicants? Do landmark court cases like the Bakke or Weber decisions have an impact on selection systems?

Not all these questions are amenable to the type of research design used in this study, nor do they need to focus on the response to applicant write-in solicitations involving fictitious candidates. Still, the issue of preferential treatment in the employment process remains of serious interest and importance to all individuals involved. Only rigorous empirical study can replace the emotional heuristics and empty quasi-theories that are extant today and offer selection officials meaningful policy implications and applicants more rational career decision processes.

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Research Notes

INDUSTRY DIFFERENCES IN ENVIRONMENTAL UNCERTAINTY AND ORGANIZATIONAL CHARACTERISTICS RELATED TO UNCERTAINTY[1]

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The relationship between organization and environment is perhaps the most popular and conceptually appealing aspect of the structural-contingency model (Lawrence & Lorsch, 1967; Miles, Snow, & Pfeffer, 1974; Thompson, 1967; Duncan, 1972). Surprisingly, however, given the centrality of organizational setting or context to this paradigm, industry differences in response to environmental uncertainty have not been noted frequently by researchers. Despite a few notable exceptions that discuss or imply industry as an important variable in organizational adaptation (Lawrence & Lorsch, 1967; Hirsch, 1975; Dill, 1958), many studies rely on data from a single company or industry (Pennings, 1975; Downey, Hellriegel, & Slocum, 1975; Leifer & Huber, 1977) or a host of different industries (Tosi, Aldag, & Storey, 1973), without introducing industry specifically as a moderating variable for or determinant of organizational response to uncertainty.

The present paper examines differences in types of uncertainty across four industries. The purpose is to determine whether industry is an important variable for the kind of uncertainty perceived by top managers and for organizational characteristics associated with uncertainty, such as structure and influence patterns.

Industry Differences

There are two, interdependent arguments why the organization in its industrial context should be a more frequent target of study for researchers interested in environmental uncertainty. The first, a substantive one, contends that there are distinguishing characteristics of industries that affect both the type of external issues or problems salient to top management and the strategies chosen to cope with them.

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There are data and conceptual arguments to suggest important differences across industries on many organizational and environmental characteristics (Bain, 1959; Berle & Means, 1932; Levine & White, 1961; Dill, 1958; Thompson, 1967; Emery & Trist, 1965). Perfect, imperfect, and monopolistic competition represent economists' descriptions of industries and the concomitant constraints facing decision makers. Market structure, concentration, and product or service line are most distinguishable by industry (Bain, 1959). The degree of concentration and type of market structure very likely determine the most problematic dependencies confronting the organization (Jacobs, 1974) and, relatedly, the environmental publics responsible for the creation of uncertainty (e.g., customers vs. the government).

Industry differences surely represent a central component of the "causal texture" of the environment (Emery & Trist, 1965). In an oligopolistic industry, the web of political and economic relationships that inevitably develops determines or affects the decisions of any single organization. For instance, firms in the automotive industry, including independent parts manufacturers, suppliers, and vertically integrated divisions of the "big three," are constrained by contracts with the UAW, thereby providing an important communality affecting perceptions of one aspect of the environment. The existence of external political and economic factors is related directly to intraorganizational politics (e.g., distribution of influence and the succession system) and economics (reward systems and degree or type of specialization; Dahl, 1963). This suggests that differences, by industry, in the existence of trade associations, regulatory agencies, market structure, or number of customers and competitors may have an important effect on organizational design and process. In similar terms, there may be "objective" characteristics of industries that affect the perceptions of managers regarding type of uncertainty and appropriate responses to it.

Thompson (1967) modified the definition of "domain" of Levine and White (1961) to mean range of products, populations served, and services rendered. Clearly, there are intra-industry differences in domain; there are probably few industries in which many organizations share identical or common domains. Nonetheless, it also is clear that there is a high positive correlation between domain and industry. At minimum, it is likely true that the domain-industry relation is stronger than the relation among domains in different industries. This suggests, again, that industry represents a convenient and important contextual factor for organizational decision making.

The second argument for examining the effects of industry is a methodological one that derives directly from the preceding discussion (Hrebiniak, 1976; Rushing, 1966). That is, choice of a heterogeneous sample of managers from different industries to study organization and environment, without controlling for industry, could lead to the methodological obfuscation of underlying results. If important characteristics or distinguishing data of a given industry vary markedly from those of another, combining respondents from both industries and treating them as a homogeneous sample may conceal important findings.

The primary contention of this paper is twofold: (a) that there are industry differences in the type of uncertainty confronting top-level managers; and (b) that responses to uncertainty in terms of structural modifications and influence patterns too will vary by industry.

Research Design

Sample—The sample of organizations was chosen in an attempt to maximize differences in industry characteristics related to uncertainty. Following Dill (1958) and Thompson (1967), it was assumed that there are measurable characteristics of industries or product/service areas that would create differences in perceived environmental uncertainty. Some of these "objective" criteria may indeed be only subjective criteria one step removed (Campbell, 1977); nonetheless, the intention of the present research was to select a sample for which environmental uncertainty was first assessed *independently* of top-level managers in the organizations chosen for study.

With the aid of seven informants—four academics and three analysts from financial/management consulting firms who had experience with a wide assortment of industries—an initial list was developed reflecting industries ranging from low to high on the degree of environmental predictability or certainty. More specifically, each expert was asked to rate industries of his own choosing from low to high on the predictability of: (a) supplies of raw materials and components; (b) competitors' actions; (c) price changes and technological developments; (d) market factors, including customers demands and number of competitors; (e) financial/capital markets, including the availability of funds for investment and interest rate fluctuations; and (f) other factors, such as the actions and pressures of government regulatory agencies and unions. The instructions were to develop one ranking of industries based on these criteria.

The initial list contained 13 industries that were mentioned by more than one informant. This list was shortened by the researchers to seven by focusing on those at the extremes of the uncertainty/predictability continuum. This was done primarily to maximize differences in the informants' rankings, but also to reduce the number of industries to a more realistic base for subsequent data collection. The shortened list was then presented to the original seven judges and to four additional academics with consulting experience. The task now was to separate the industries into three groups—low, high, or "mixed" levels of uncertainty—using the criteria presented above. The result was that 2 industries—automotive and air transportation—were always ranked low in uncertainty by the 11 judges, and 2 others—plastics/synthetic resins and semiconductors—high on uncertainty. A coefficient of concordance using the low-high dichotomy was at its maximum ($W = 1.00$) because of the agreement among the judges. Based on these data, the four industries were selected for additional data collection and analysis.

Companies in each industry were selected from Standard and Poor's *Register of Corporations, Directors and Executives* (1976) and the Dun and Bradstreet *Million Dollar Directory* (1976). Firms were initially considered for inclusion in the sample only if their 4-digit SIC code in both directories indicated that their sole or primary business was in the desired industry. Because only a few large plastics firms appeared in both directories, it was necessary to add to the sample eight firms whose business was not primarily plastics. In these cases, the cover letter specifically asked the respondent to use the company's plastics and/or synthetic resins business, division, or group as a frame of reference for answering questions. The total sample selected for the first mailing of questionnaires was 100, as follows: automotive (25 organizations); air transportation (32 organizations); plastics/synthetic resins (24 organizations); semiconductors (19 organizations).

Respondents for each organization were also chosen from the Standard and Poor's and Dun and Bradstreet directories. All respondents were top-level managers with the responsibility for environmental surveillance and the authority associated with the institutional level of organization. The sample included: chairmen of the board (and/or chief executive officers), presidents (and/or chief operating officers), executive or senior vice presidents, vice presidents, general or group managers, and division managers. Questionnaires and explanatory cover letters were mailed to 721 executives in the 100 organizations. After a period of several weeks, a follow-up letter and questionnaire were sent to those managers who had not yet responded. The two mailings resulted in a sample of 247 usable questionnaires (34 percent) from executives in 88 companies.

Questionnaire Items and Variables—Environmental uncertainty was assessed by asking the managers to rate various environmental elements or publics on their degree of certainty/predictability. The 33 questionnaire items tapped the same areas previously considered by the informants: supplies of raw materials, competitors' actions, product market factors, financial/capital markets, regulatory agencies, unions, and other related factors.

The items were subjected to factor analysis (varimax rotation). Using an eigenvalue score of 1 as a cutoff, five factors emerged from the analysis. In all, 19 items loaded on the 5 factors, and appropriate items were averaged for each respondent. Relationships among the estimated factor scores were examined, despite the fact that the factors themselves are orthogonal (Nunnally, 1967), and the scores were not significantly related. The five factors of environmental uncertainty deal with the degree of predictability of: financial/capital markets (financial); government regulation and intervention (government); the actions of competitors (competitors); suppliers' actions (suppliers); and general conditions facing the organization (general). In the present sample, then, uncertainty appears to be a heterogeneous concept comprised of five independent dimensions or problem areas.

The number of different sources of uncertainty with which an organization must contend is one measure of environmental complexity; the greater the number of external factors highly uncertain for the decision maker, the greater is the complexity he confronts. In the present research, complexity was operationalized by comparing a manager's perception of the five types of uncertainty with that of other managers in the industry. If the individual perceived a higher level of uncertainty than the industry average for a given type, a score of one (1) was assigned. This was repeated five times, so that environmental complexity could vary from zero to five, with five denoting high complexity.

Measures of organizational structure also relied on the opinions of the managers. It was assumed that top managers' responsibility for the creation of structure and their hierarchical vantage point would enable them to provide information about some basic structural dimensions in their organization. The items of Hrebiniak (1974) were used to measure routineness of work, reliance on rules for control, and the extent of autonomy and decentralization in decision making. Although reliability statistics were acceptable in that study, items were subjected to factor analysis to ensure their consistency in the present research. The results were in accord with those of the previous study, resulting in two distinguishable factors satisfying the 1 cutoff for eigenvalues. Consistent with Nunnally (1967), relationships between factor scores again were determined, with no significant results.

Items loading on the first factor dealt with autonomy and participation in decision making, and the factor was named decentralization. Items loading on the second factor were concerned with routineness of work, extent of reliance on rules for control, and a lack of employee participation in goal setting, and this factor was labeled standardization.

Respondents also were asked how many hierarchical levels their organization has according to formal published charts. To test the validity of the responses, the charts from eight organizations were obtained from published sources and compared to managers' responses. The correlation between published charts and managers responses ($n = 27$) was .84 ($p < .001$).

The primary concern in this research was the relationship between organizational structure and environmental uncertainty, but the questionnaire also queried respondents about influence in their organizations. This was done in recognition of the fact that influence patterns are affected by environmental contingencies (Hrebiniak, 1978; Jacobs, 1974). Individuals or groups who confront the major or problematic dependencies facing the organization typically receive resources commensurate with their responsibilities and derive power or social influence reflecting that centrality and resource base (Dahl, 1963; Hickson, Hinings, Lee, Schneck, & Pennings, 1971). Accordingly, respondents were asked to rate on a 5-point scale the importance of various departments, units, or functional areas for the solution of problems or the attainment of organizational goals.

Findings

Table 1 shows the means and standard deviations for the variables in this study and the analysis-of-variance results when testing for industry differences. Table 1 also notes the *t*-values between low- and high-uncertainty industries, where the independent variable is the binary distinction provided by the informants, as described above.

A number of findings are suggested by the data in Table 1. Consistent with expectations, industry is associated with varying levels of the different types of environmental uncertainty, the *F*-ratios indicating significant differences. The *t*-tests show that the low- and high-"objective"-uncertainty variable developed via the use of independent judges is not as strong as industry in explaining differences in the perception of top-level managers. Differences between the low- and high-uncertainty groups appear to be due primarily to within-category variations explained by industry. Although there are clear differences across industry in the types of uncertainty, there are no differences in environmental complexity, a variable derived directly from the five sources of uncertainty.

Table 1 also shows fairly strong differences in the influence of departments, units, or functional areas across the four industries. On the dimensions of organizational structure, only decentralization exhibits any significant variation. In essence, the data in Table 1 indicate that there are differences by industry in the type of uncertainty and unit influence perceived by top managers. The issue next is to determine whether the relationships between uncertainty and both organizational structure and intraorganizational influence also vary by industry.

To test this aspect of the structural-contingency model correlations were run between the types of uncertainty and the three measures of organizational structure (Table 2). Table 2 reveals that there indeed are relationships between uncertainty and structure, but that the strength and direction of the correlations vary by industry. For example, in both the plastics/synthetics ($p<.05$), and air transportation industries ($p<.01$), environmental complexity is positively associated with standardization; in semiconductors ($p<.10$) and motor vehicles ($p<.05$), however, just the opposite is true. Decentralization is positively related to complexity in plastics ($p<.005$), semiconductors ($p<.05$), and air transportation ($p<.05$), but negatively related in motor vehicles ($p<.10$). Decentralization is negatively related to uncertainty due to financial markets ($p<.01$) and the government ($p<.05$) in semiconductors, but positively related in air transportation ($p<.10$ and $p<.01$ respectively). These data suggest that the relationships between decentralization and standardization, on one hand, and uncertainty and complexity, on the other, are affected by industry and do not follow directly from a universal structural-contingency model.

TABLE 1
Means and Standard Deviations for All Variables, *F*-Ratios Across Industries and *T*-Scores Between Low- and High-Uncertainty Industries
($N = 247$)

	High Uncertainty (Informants' Ranking)		*Low Uncertainty (Informants' Ranking)*			*Tests for Differences T Values*		
	1 *Plastics/ Synthetics Resins* ($n = 55$)	*2* *Semi-Conductors* ($n = 26$)	*3* *Motor Vehicles* ($n = 55$)	*4* *Air Transportation* ($n = 111$)	*F-Ratio Across Industries* 1×2×3×4	*Between High & Low Uncertainty (1&2) (3&4)*	*Within High Uncertainty Category* 1×2	*Within Low Uncertainty Category* 3×4
Uncertainty								
Suppliers	2.52 (.75)	2.74 (.69)	2.81 (.82)	2.47 (.82)	3.27*	.11	1.49	2.89**
Competitors	2.71 (2.51)	3.06 (.63)	2.55 (.72)	2.47 (1.01)	3.27*	2.95**	1.92*	.47
Financial/capital markets	2.17 (1.44)	2.46 (1.18)	2.15 (1.44)	2.34 (1.02)	2.74*	1.25	1.39	1.35
Government	3.51 (1.24)	2.74 (.95)	3.56 (1.24)	3.35 (.82)	6.70**	2.56**	3.54**	1.60
General	2.73 (1.05)	3.15 (1.44)	3.01 (1.23)	3.29 (.74)	8.11**	2.10*	2.50**	2.42*
Complexity	2.45 (.48)	2.46 (1.07)	2.51 (.82)	2.32 (1.46)	.27	.24	.02	.80
Organizational Structure								
Hierarchical levels	4.13 (1.24)	3.96 (1.04)	4.07 (1.24)	4.45 (2.06)	.48	.61	.33	.84
Standardization	3.51 (.61)	3.72 (.57)	3.47 (.85)	3.32 (.99)	1.61	2.10*	1.27	1.07
Decentralization	3.66 (.99)	3.42 (2.03)	3.36 (.76)	3.20 (.63)	6.50**	2.53**	1.35	1.56
Power/Influence								
Sales and marketing	4.35 (1.24)	4.08 (1.31)	4.16 (1.12)	4.16 (1.36)	.33	.24	.82	.00
Production	4.07 (1.29)	3.88 (1.09)	3.71 (1.26)	3.34 (1.59)	3.69**	2.47*	.68	1.53
Maintenance	3.02 (1.06)	2.46 (1.19)	2.40 (1.14)	3.71 (1.23)	17.15**	1.75	1.89*	6.68**
R&D	3.76 (1.25)	3.77 (.63)	3.29 (1.00)	2.21 (1.41)	22.83**	5.54**	.02	5.11**
Distribution	2.76 (.84)	2.58 (.76)	2.84 (.60)	2.19 (1.75)	3.07*	.88	.74	2.57*
Finance/accounting	3.13 (.62)	2.85 (.93)	3.44 (2.19)	3.70 (1.37)	5.02**	3.68**	1.11	1.38
Legal	2.64 (.50)	2.35 (1.3)	2.92 (1.51)	3.19 (1.32)	5.01**	3.05**	1.03	1.99
Engineering	3.31 (1.41)	3.92 (1.21)	3.84 (1.16)	2.93 (1.25)	8.40**	1.20	1.91	4.12**
Personnel/labor relations	3.02 (1.38)	2.62 (1.02)	3.05 (1.22)	3.56 (1.22)	6.43	2.90**	1.38	2.91**
Purchasing	3.20 (1.37)	2.58 (1.09)	3.09 (.97)	2.74 (1.17)	3.02*	.14	2.11*	1.91

*$p < .05$
**$p < .01$

TABLE 2
Correlates Between Type of Uncertainty and Organizational Structure for Four Industries[a]

Organizational Structure	*Suppliers*				*Competitors*				*Financial*			
	1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*
Standardization	.16	−.35**	−.29***	.10	.12	−.25*	−.19*	.08	.15	−.08	−.20*	.29***
Decentralization	.19*	.26*	−.24**	.09	.06	−.10	−.25**	.12*	.14	−.47***	−.14	.14*
Hierarchical levels	.15	−.22	.10	−.06	.11	.10	−.10	.28***	.07	.35**	−.12	−.02
Organizational Structure	*Government*				*General*				*Complexity*			
	1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*
Standardization	.16	.04	−.23**	.14*	.00	.10	−.04	.15*	.26**	−.27*	−.24**	.24***
Decentralization	.07	−.37**	−.11	.20***	.28**	.02	−.20*	.17**	.36***	.38**	−.20*	.18**
Hierarchical levels	.12	.31*	.11	−.01	.14	−.04	−.06	.24***	.15	.08	.04	.13*

[a] Industry 1 = Plastics/Synthetic Resins ($n = 55$); 2 = Semiconductors ($n = 26$); 3 = Motor Vehicles ($n = 55$); 4 = Air Transportation ($n = 111$).

*$p < .10$

**$p < .05$

***$p < .01$

Consistent with expectations, it also is clear from Table 2 that, the modest correlations notwithstanding, patterns of response to uncertainty vary significantly by industry. Of the 18 correlational sets in Table 2, where "set" denotes the four industry correlations between one structural and one uncertainty variable, a total of 14 (78 percent) exhibit significant intra-set differences among the obtained correlations. Although the relationships between structure and uncertainty are not extremely strong, the differences in correlations by industry are significant, suggesting the importance of organizational context for managerial perceptions and responses.

The data in Table 2 also provide some support for the methodological argument for the separation of a heterogeneous sample into homogeneous subsets based on industry to avoid the obfuscation or cancellation of underlying statistical relationships between uncertainty and structure. To emphasize this point, correlations were run assuming a homogeneous sample, i.e., without separation by industry (not shown), and the results were striking, with only four correlations reaching statistical significance at $p < .10$. The net effect appears to be one of statistical cancellation, as industry differences are obscured by the overall correlations.

Summary

The present data suggest that organizational researchers increasingly should incorporate industry effects into their efforts at theory development and empirical research. The study shows that perceptions of environmental uncertainty, intraorganizational influence, and degree of structural decentralization vary by industry. The data also indicate that structural responses to environmental uncertainty are affected by industry, suggesting that the popular structural-contingency model may indeed be comprised of "models," depending on organizational domain or setting.

The present study is clearly limited because of its nondeductive approach to the specification of industry effects on top-management perceptions. Future research should focus more on theory building and the hypothesis of industry effects, testing those more precise predictions in a variety of different industrial settings.

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SOME ALTERNATIVE DEFINITIONS OF SIZE[1]

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The "size effect" has plagued researchers for decades, perhaps because most discussions have adopted a uniform definition of organizational size, namely, the number of members (Kimberly, 1976). The contradictory and ambiguous accumulation of evidence suggests, however, that it is time to stop viewing size as a unidimensional construct. The present study attempts to pose, and to explore the empirical relationships among, alternative definitions of organizational size.

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[1] An earlier version of this paper by Nina Gupta and Robert A. Cooke was presented at the 85th Annual Convention of the American Psychological Association, San Francisco, 1977. Data for this study were collected by the Survey Research Center under contract with the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research.

At least three perspectives can be invoked to define organizational size. In this paper, these are termed the cycles, the energic, and the components approaches, respectively. The cycles approach views size as a structural characteristic of organizations; the energic approach focuses on the resources (human or otherwise) used by an organization. While these two perspectives are rooted in diverse views of the nature of organizations, the components approach elicits its definition of size from tradition and common usage.

The *cycles approach* to the definition of organizational size is based on the assertion that "structure is to be found in an interrelated set of events that return upon themselves to complete and renew a cycle of activities" (Katz & Kahn, 1978, p. 24). If organizational structure derives from cycles of activities, then the number of these cycles can provide a reflection of the size of organizations. According to this approach, organizations can be identified by following chains of events from the input of energy through transformation and the closure of the cycle, and the size of an organization approximated by estimating the number of times the cycle repeats itself within a given period of time. Thus, the size of a research organization might be assessed in terms of the number of projects completed, the size of a hospital in terms of the patients treated, etc.

Although this approach enables a determination of size in terms of primary organizational goals, it ignores the complexity of various cycles of events. For example, an organization performing a few complex cycles is in many respects larger than one performing many simple cycles, but the cycles approach would define the latter as being the larger of the two. Therefore, the complexity of inputs is a complementary aspect that must be incorporated into this approach. Complexity can vary within each unit of input (i.e., the number of factors that must be dealt with in the transformation process), and across units of input (i.e., the similarity or diversity of factors across inputs). In general, the cycles approach to the definition of organizational size mandates a focus on at least three aspects of the cycles of activities—the number of repetitions, the intra-unit heterogeneity, and the inter-unit heterogeneity of each cycle.

The *energic approach* focuses on the amount of energy imported by the system. Organizations are open systems that import energy from the environment, export energy back into the environment, and consume energy in the transformation process (Katz & Kahn, 1978; Von Bertalanffy, 1956). The amount of energy imported may be considered another indicator of size. Imported energy is reflected in such variables as the relative time contributions of different organizational members (rather than their membership per se), the degree of use of various machines, etc.

The energic approach has certain strengths and weaknesses. On the negative side, it is often difficult to define energy operationally. Questions arise regarding the relative weightings of the time contributions of various individuals, as do questions regarding the energic contributions of tools such as computers. Furthermore, this approach may lead to the conclusion that inefficient systems are larger than efficient ones performing the same number and types of activities, because the former import and consume more energy than do the latter. On the positive side, the energic approach is likely to capture the differential contributions of organizational members and, to some extent, be related to the number and complexity of activity cycles performed by the system.

The *components approach* to the definition of organizational size is the traditional one, involving a simple count of the number of individuals involved in carrying out the cycles of activities. Kimberly (1976) noted that over 80 percent of the studies he reviewed used this definition of size. The major advantage of the components approach is its simplicity. Additionally, this approach may implicitly take account of the other approaches to the definition of size. That is, organizations characterized by complex inputs, long chains of activities, etc., may necessarily involve a large number of components. (The direction of causality here may be reciprocal. Many people may be needed to carry out complex organizational activities, and the availability of personnel may permit or promote the complexity of these activities.) Despite these advantages, the components approach has limitations. For example, it is often difficult to determine which individuals should be considered organization members (Bluedorn, 1978; Porter, Lawler, & Hackman, 1975). "Partial inclusion" of individuals also makes the determination of membership problematic. Furthermore, the components approach, like the energic input approach, inherently mixes size with efficiency in that it assumes that a system composed of many members is necessarily larger than one composed of few members, even if both are performing the same activities and the same number of cycles. For example, one organization may require 100 people to carry out the same activities performed by 50 people in another organization. Is the first organization larger (it performs the same activities and the same number of cycles), or is it simply less efficient (it uses twice as many people)? The components approach would define the first organization as the larger of the two. This definition may or may not be valid depending on one's perspective.

These three approaches to the definition of organizational size bear some resemblance to those suggested by Kimberly (1976): personnel available to the organization, discretionary resources available to the organization, organizational outputs, and the physical capacity of the organization. For example, discretionary resources is similar to the energic approach, and organizational outputs to the cycles approach. Physical capacity is the only measure not easily incorporated within the three approaches outlined here. A particular advantage to the present perspective of size is that the alternative definitions are applicable regardless of organizational context. In other words, energic input, activity cycles, and number of components are relevant to all kinds of organizations, whereas other definitions (sales volume, net assets, etc.) have relevance for only certain categories of organizations. Thus, the present approach facilitates comparative organizational studies of the size effect.

In summary, the present study assesses the degree of empirical congruence among measures of size derived from three different perspectives. Most past investigations of the size effect have been based on the implicit assumption that size is a unidimensional construct definable as the number of organizational employees. Only rarely (for example, Hyderbrand [1973]) are the reasons behind the choice of a particular size measure discussed explicitly. Thus, although few researchers would claim specifically that there is a single measure of size or that all size measures are interchangeable, their work generally has been based on these premises (Acton Society Trust, 1953; Indik, 1965; Revans, 1956).

Method

Data were obtained from a national probability sample of institutions having assurances of compliance with DHEW regulations regarding the protection of human subjects of biomedical and behavioral research. The institutions ranged from universities and hospitals to prisons. Data were collected from 80 Institutional Review Boards (IRBs), which are subsystems designed to monitor the research activities of the institutions they serve, particularly with respect to the protection of human subjects. Within each IRB, data from three sources were used: the chairperson or another key member of the IRB ($N=80$), the IRB members ($N=745$), and the principal investigators of the research reviewed by the IRBs ($N=2,110$). Data from the IRB members and principal investigators were aggregated at the IRB level for analysis.

Six measures of size from the three perspectives were available in the data set. The three measures from the cycles perspective were number of activity cycles, intra-unit heterogenity, and inter-unit heterogeneity. *Number of activity cycles* was operationalized as the number of proposals reviewed by the IRB during the course of the year and was based primarily on information from key members. IRBs had reviewed anywhere from 1 to 357 proposals in the previous years. *Intra-unit heterogeneity* was derived from information provided by the principal investigators. A count of the number of different elements (administration of anesthetic, exchange transfusion, etc.) involved in each project was aggregated across the projects reviewed by an IRB to yield a measure of intra-unit heterogeneity. *Inter-unit heterogeneity* was a rather complicated measure based primarily on information supplied by the principal investigators. The primary nature of the research was ascertained for each proposal (drug administration, research on educational innovation, etc.). Inter-unit heterogeneity was operationalized as the average entropy of the types of proposals reviewed by the IRB, with entropy calculated from the information theory measure, $-H = \Sigma p_i \log 2 p_i$ (Attneave, 1959; Hill, 1975). Thus, the measure basically was an estimate of the proportion of different types of proposals reviewed by the IRB during the previous year.

Two size measures were obtained from the energic perspective. ***Energic input I*** was based on information from IRB members. The average amount of time spent by members on IRB-related activities was assessed through a multiplication of the average number of hours per member per month times the number of members. Thus, this index reflected the total number of hours spent, on the average, by all members on IRB-related activities. ***Energic input II*** was a parallel index indicating the total number of hours spent, on the average, by all members in IRB meetings.

Finally, there was a single size measure from the components perspective. ***Number of members***, the traditional measure of size, consists simply of the number of members in each IRB, and was based on information obtained from key members. The IRBs ranged from five to 55 members.

Results

Table 1 presents a matrix of intercorrelations among measures derived from three alternative conceptualizations of size. It can be seen immediately that four measures (number of members, number of cycles, inter-unit heterogeneity, and energic input II) are positively correlated with one another. The other two measures, intra-unit heterogeneity and energic input I, have no relationship either with each other or with any measure of size. Thus, measures of size from the same perspective do not necessarily correlate with one another.

The strongest correlations are evident with energic input II (a measure of the number of hours spent in IRB meetings) and the other size

TABLE 1
Intercorrelations Among Six Measures of Size[a]

Measures of Size	*1*	*2*	*3*	*4*	*5*
Cycles Perspective					
1. Number of activity cycles					
2. Intra-unit heterogeneity	.01 (78)				
3. Inter-unit heterogeneity	.47** (78)	-.08 (78)			
Energic Perspective					
4. Energic input I	.16 (75)	.10 (73)	.18 (73)		
5. Energic input II	.66** (73)	.04 (71)	.33** (71)	.06 (69)	
Components Perspective					
6. Number of members	.45** (79)	.11 (77)	.28* (77)	.06 (75)	.76** (73)

[a] *N*'s are in parentheses.
*$p < .05$
**$p < .01$

measures. It is reasonable to assume that the larger the IRB membership, the higher the workload of the IRB, and the more complex the task, the greater the amount of time that must be spent in accomplishing the task. It is surprising, however, that the other measure of energic input, hours spent in IRB-related activities, showed no significant correlations with other size measures.

Discussion

In the present study, some alternative definitions of organizational size were examined among a sample of organizational subsystems. Because the unit of analysis was a specific maintenance subsystem of the organization, rather than the organization, it is not clear whether the results can be legitimately generalized to the universe of organizations. On the other hand, the data were drawn from a national probability sample of maintenance subsystems, and the result can be considered at least fairly representative of the dynamics of these specific systems.

Within the limitations of the data base, the results of the present study provide ample evidence of the fallacy of treating organizational size as a unitary construct, because the relationships among the different measures of size are, at best, low to moderate. The highest correlations were obtained between an energic input measure (hours spent in IRB meetings) and measures of the number of components and the number of activity cycles. That these relationships are strong should hardly be surprising. Both conceptually and operationally, the energic input measure consists partly of the other two. That is, the number of components and the magnitude of the tasks will be somewhat relevant in determining the amount of time that is spent in accomplishing the tasks. Even these relationships, however, are smaller than those generally reported among alternative measures of size (Agarwal, 1979; Child, 1973).

The absence of substantial correlations among the measures of size in the present study is all the more unusual in that the data were obtained from an apparently homogeneous sample of organizational entities. The IRBs in the sample had a similar mandate (to monitor the research activities of the parent institution), and the general functions of and structures adopted by the IRBs were more alike than would be expected if a national sample of organizations were drawn. Thus, the present results reinforce the conclusion of Agarwal (1979) that different measures of size are not really interchangeable.

A critical examination of the theoretical and operational definition of size gains particular salience in view of the relative empirical independence of the measures in the present study. Kimberly (1976) suggested that different aspects of size are relevant for different types of organizational problems and are related to different organizational phenomena. A potential explanation for the contradictory evidence with respect to the size effect may rest with the appropriateness of the definition of size to the other variables of interest. For example, number of employees may be related to organizational climate, energic input to perceived task characteristics, and activity cycles to organizational technology. Obviously, it is impossible to isolate these differential relationships with the use of only one definition of size.

The present study examined only the static relationships among measures of size derived from alternative theoretical perspectives. Therefore, no information can be gleaned from the data base about the longitudinal dynamics among these measures. For example, an increase in the number of activity cycles may under some circumstances be accompanied by an increase in the number of employees, as well as in the amount of energic input. On the other hand, changes in energic input may or may not affect other aspects of the size phenomenon. A comprehensive understanding of the issue must integrate the longitudinal as well as the static dynamics among the various aspects of size.

Another issue of relevance in the present context is the extent to which the construct of size is viable. That is, is organizational size a global variable consisting of many components that share some theoretical space, or are the different aspects of size theoretically (and not just empirically) independent? If the latter is true, it might be wise to abandon the notion of size per se and to focus on those aspects of the organizational anatomy that are particularly germane to a specific research question. If, on the other hand, the construct of size has some viability, the elucidation of the dynamics among the various aspects of the construct becomes a critical research question.

In summary, two general conclusions are warranted from the present study. First, measures of size derived from different perspectives bear only moderate empirical relationships with one another, indicating that the size effect obtained in any study may be dependent largely on the specific operationalization of size. Second, a theoretical and methodological exposition of the dynamics of this important anatomical characteristic of organizations must be undertaken if the issue of size is to become comprehensible.

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TURNOVER AND COMPETITION FOR EXPECTED JOB OPENINGS: AN EXPLORATORY ANALYSIS

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The extent to which alternative occupational roles are available in the environment often has been considered as central to the voluntary decision to leave an organization. Recently, Martin (1979) and Mobley, Griffeth, Hand, and Meglino (1979) have proposed contextual models of the employee turnover process. Both models predict that dissatisfied employees with good external job opportunities are more likely to leave than are counterparts with poorer opportunities. Although it often has been assumed that the availability of alternatives exerts a significant influence on turnover, few empirical findings support this view. At the aggregate level, Armknecht and Early (1972), Price (1977), Woodward (1975), and others have reported an association between voluntary turnover and overall economic conditions. Analyses of this type, however, are not very useful in attempting to understand the process underlying individual employee decisions.

In the Mobley et al. (1979) model there is a linking mechanism between the conditions of the external labor market and individual turnover behavior. This model included variables corresponding roughly to the March and Simon components of "perceived ease of movement from the organization" (1958, p. 93). Mobley et al. contend that there is a compelling conceptual argument for including this class of variables but weak empirical support at the individual level because of infrequent research. The typical approach has been to ask current employees to estimate the probability of finding an acceptable alternative (Dansereau, Cashman, & Graen, 1974;

Martin, 1979; Mobley, Horner, & Hollingsworth, 1978). These studies have provided very weak and contradictory evidence regarding the role of the external labor market.

The failure of past research to establish a clear relationship between opportunity and turnover may be in part a result of two problems. First, opportunity often has been measured via questionnaire items with unknown or borderline psychometric properties. Second, it may not be reasonable to expect current employees to make accurate estimates about future job opportunities. Many employees may not be aware of the actual demand for their occupational skills and may make self-deceiving estimates of their ability to find acceptable alternative employment. The best knowledge concerning availability probably is derived only after an actual search for alternatives. In the studies reported, current employees, who were not necessarily searching for other jobs, made subjective estimates regarding employment availability. These estimates may change once the individual initiates a search and therefore may not correspond to the actual decision making process.

Two additional strategies for studying this phenomenon seem worthy of further consideration. One would incorporate measurement across time to monitor the perceived probability of finding an acceptable alternative. This would more closely track the search process and should result in more accurate, timely estimates. It would allow for a continuous refinement of the perception that should reflect more clearly the actual labor market conditions.

A second approach would be to use objective estimates of employment opportunity for various occupational groups. As employees initiate search activities and gain accurate information about labor market conditions, there should be an increased correspondence between their perception and the objective estimate made by an independent party. This orientation is compatible with the views expressed by Roberts, Hulin, and Rousseau (1978). They argued that turnover studies should attempt to synthesize research focusing on the effects of the economy, organizational factors, and individual differences. Although macro-level scores would need to be assigned to individuals, it is possible to link, conceptually, these environmental characteristics to employee responses using the Mobley et al. (1979) framework. This type of conceptual linkage is required before disaggregation is appropriate. It also would be important to be as person specific as possible when using this approach. The national unemployment rate would not be useful in explaining individual responses, but economic indicators specific to individual occupations could more adequately be tied conceptually to individual behavior.

The purpose of this study was to explore the potential of this second approach. Department of Labor estimates were used along with job attitudes to predict turnover in a longitudinal study. Attitudes regarding the work environment were included because the impact of labor market conditions may be indirect, operating through or interacting with these attitudes in influencing turnover. Dansereau et al. (1974) and Martin (1979) provide illustrations of this possibility. Both the direct and moderating effects of competition for expected job openings were examined in the current study.

Method

Attitudinal measures collected in 1976 were available from 692 managerial, professional, and technical (MPT) employees of a large national oil company. Questionnaires had been completed at home and returned in postage-paid envelopes. The return rate for complete questionnaires was 49 percent. Subjects had been identified so that additional information could be obtained from company records and for tracking purposes. Anonymity was guaranteed. This sample accounted for approximately 10 percent of all the company's MPT employees and was very representative of the population in terms of company-rated performance, age, service, educational level, and salary and has been described in detail by Dreher (1977). The sample averaged 42 years of age and 17 years of service and was slightly above the bachelor's level educationally.

In 1978 information on the withdrawal behavior of the group was collected. Of the 692 employed in 1976, 44 had voluntarily resigned, 35 had taken early or normal retirement, and 602 were still employed. The additional 11 employees were either deceased, had been terminated, or were on leave of absence.

The 44 employees who voluntarily resigned and 44 continuing employees randomly selected from the original sample were then categorized according to the U.S. Department of Labor's Occupational Outlook Handbook classification system (U.S. Department of Labor, 1976). The random sample was drawn using the sampling procedure from the Statistical Package for the Social Sciences (SPSS) (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975). Categorization into the Department of Labor's job system was possible because the original data set included the job title, educational background, and job grade for each employee. The company's job classification system was quite complex and did not translate directly into the Department of Labor categories. Therefore, an experienced company official made classification decisions based on the available information. Table 1 shows the occupational groups represented and the number of employees in each category.

Each job was then evaluated in terms of its employment opportunity using the U.S. Department of Labor (1976) *Occupational Outlook Quarterly* as a guide. Supply-demand characteristics are supplied for most professional and technical jobs in this publication. The supply-demand relationships are characterized by the degree of competition for expected job openings—excellent, very good, good or favorable, may face competition, or keen competition. Table 1 also shows the adjectives assigned to each

TABLE 1
Occupations and Employment Opportunity[a]

Occupation	*n*	*Occupational Opportunity Adjective*
Accountant	12	Very good (2)
Advertising worker	1	May face competition (4)
Civil engineer	6	Very good (2)
Chemical engineer	4	Very good (2)
Claims representative	1	Good or favorable (3)
Computer operating personnel	1	Good or favorable (3)
Economist		
(bachelor's degree)	1	Keen competition (5)
(graduate degree)	2	Good or favorable (3)
Electrical engineer	5	Very good (2)
Geologist		
(bachelor's degree)	3	Good or favorable (3)
(graduate degree)	7	Very good (2)
Geophysicist	2	Excellent (1)
Industrial engineer	1	Very good (2)
Lawyer	1	Keen competition (5)
Librarian	1	May face competition (4)
Mathematician	2	Keen competition (5)
Mechanical engineer	8	Very good (2)
Mining engineer	1	Very good (2)
Personnel and labor relations worker		
(bachelor's degree)	6	May face competition (4)
(graduate degree)	1	Good or favorable (3)
Petroleum engineer	2	Very good (2)
Physicist	1	Good or favorable (3)
Real estate	1	Good or favorable (3)
Systems analyst	1	Excellent (1)
Wholesale trade sales worker	17	Good or favorable (3)

[a] Values in parentheses represent the scaled competition index.

job in the study. If the statement indicates excellent employment opportunity (as in the case of the two geophysicists), the demand for qualified applicants is expected to exceed greatly the supply. If the supply of qualified applicants is likely to exceed greatly the demand (as in the case of the two mathematicians), the statement indicates keen competition.

Competition was indexed with a 5-point scale corresponding to the supply-demand adjectives. The scale ranges were 5 = keen competition to 1 = excellent opportunity.

The attitudinal variables were measured by multiple opinion survey items that were averaged to form composite indices. The item composition for each index was determined on the basis of previous factor analytic studies of opinion survey items by the company. The dimensions, internal consistency reliability estimates, and dimension intercorrelations are shown in Table 2. The actual items and item intercorrelations are available from the first author. Turnover was coded 1 = voluntary resignation, 0 = continuing employee.

Results and Discussion

The point biserial correlations between turnover and the seven attitudinal dimensions are consistent with previous research. Three major reviews

TABLE 2
Variable Intercorrelations and Regression of Turnover on Attitudinal Dimensions and Competition for Job Openings[a]
($N = 88$)

Variable	β	Intercorrelations								
		1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1. Supervision	–.31[b]	(.90)								
2. Advancement	–.05	.42	(.86)							
3. Benefits	–.16	.26	.13	(.90)						
4. Satisfaction with the work	–.02	.38	.55	–.06	(.81)					
5. Work group efficiency	–.05	.62	.34	.25	.47	(.82)				
6. Work load	.07	.29	.16	.26	.12	.21	(.79)			
7. Compensation	.12	.29	.52	.29	.31	.03	.29	c		
8. Competition	–.27[b]	.05	.04	.02	.06	.02	.18	16	—	
9. Turnover	—	–.37	–.17	–.21	–.15	–.29	–.09	–.08	–.26	—
	$R = .48$[a]									

[a]Values in parentheses are internal consistency reliabilities obtained by applying the Spearman-Brown prophecy formula to the mean interitem correlation for each dimension. These estimates were based on the full sample of 692. The attitudinal items conformed to a Likert-type format with five scale values. $r > .18$, $p < .05$.

[b]Significant at $p < .01$; R adjusted for number of variables in the equation $= .39$.

[c]Spearman-Brown estimates were computed for scales with more than two items. This scale contained two items that were significantly correlated beyond the .001 level ($r = .61$).

of the turnover literature have reported consistent but not especially high negative correlations between turnover and job attitudes (Mobley et al., 1979; Muchinsky & Tuttle, 1979; Porter & Steers, 1973). Of greater note is the finding that competition for expected job openings is negatively correlated with turnover. As competition in the labor market increases, there is a tendency toward lower resignation rates. Also, as can be seen in Table 2, the competition variable tends to make a unique contribution to the prediction of turnover. The correlations between competition and job attitudes are near zero in most instances, and competition and attitudes regarding supervisory practices represent the major contributors in the regression of turnover on all eight predictors.

To test for an interaction between job attitudes and competition, both subgroup analyses and "increment in R^2" tests were performed. The results of both procedures indicate a nonsignificant interaction effect.

The key finding of this study is that competition for expected job openings, as indexed in a U.S. Department of Labor (1976) publication, is predictive of employee turnover. Although the predictive power of the variable is not high it seems to represent a unique component that emphasizes the importance of external environmental conditions in a study of individual organizational behavior. It supports the inclusion of this component in the recent contextual models of the turnover process proposed by Martin (1979) and Mobley et al. (1979).

The findings also suggest a practical application. Many organizations use opinion survey results to aid in human resource planning and management activities. The prediction of future turnover rates could be enhanced potentially if occupational categories corresponding to existing labor market estimates of supply and demand were incorporated in opinion surveys. Respondents could check the occupational category that most represents their job. This information could be indexed and combined with attitudinal measures in predictive models of turnover. Furthermore, it is likely that the predictive power of information of this type could be increased by refining the technique. Firms could more precisely estimate external employment opportunities by focusing on regional and occupation specific publications describing anticipated supply and demand.

It also is interesting to note that competition produced a direct effect on turnover rather than an interaction effect with job attitudes. Additional work is needed that focuses on the distinction between these competing hypotheses.

Finally, because this was an exploratory study, the results need to be viewed cautiously. The sample size is relatively small and creates problems for two reasons. First, the results may be unstable, particularly the beta weights for the set of attitudinal measures because these variables are intercorrelated (Darlington, 1968). Therefore, the relative importance of the attitudinal variables cannot be clearly interpreted. Second, the proportion of stayers to leavers in the sample does not approximate the ecological proportion in the company's work force. The results do not indicate the actual amount of variance accounted for in this organization. However, the focus of the study was on the possible utility of labor market competition as a predictor of turnover. The attitudinal variables were included only as a control and to test for a potential interaction effect. The overall predictive power of all independent variables and the relative contribution of each are not central to the study. When viewed in this manner, the results should encourage researchers to view turnover from the interactionist position stressed by Roberts et al. (1978) and to include measures of the economic environment along with organizational and individual level constructs in future studies of the withdrawal process. The usefulness of archival data provided by governmental agencies seems to offer a high potential in this research area.

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THE EMPIRICAL DIMENSIONALITY OF THE JOB CHARACTERISTIC INVENTORY

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The study and measurement of perceived task characteristics has attracted a great deal of empirical research in recent years. According to Pierce and Dunham (1976), empirical research has tended to suggest that perceived task characteristics have a positive relationship with worker responses. Recently however, researchers have begun to question the validity of the multidimensional approach to the study of tasks, at least as assessed by the Job Diagnostic Survey (JDS) (Hackman & Oldham, 1975). Dunham (1976), for example, administered the JDS to a large sample of employees in one organization. Factor analysis results suggested that a single-factor solution representing job complexity was the most parsimonious representation of task dimensionality.

In a somewhat more comprehensive study, Dunham, Aldag, and Brief (1977) collected data with the JDS from 5,945 workers representing 20 subsamples from 5 organizations. Their findings suggested that two, three, four, and five-factor solutions existed for various samples. Dunham et al. indicate that "*the exact five-dimensional, a priori structure was* *reproduced in only two cases*" (1977, p. 222). As an explanation for these findings, Dunham (1976) and Dunham et al. (1977) appear to favor the idea that task dimensionality varies across settings. They do suggest, however, that an alternate explanation might be that "a multi-dimensional construct exists, but the JDS is inadequate for assessing this multidimensionality in at least certain circumstances" (1977, p. 222). Due to the availability of other perceptual measures of task characteristics, this alternate explanation bears investigation.

Sims, Szilagyi, and Keller (1976), for example, developed an instrument for measuring perceptions of variety, autonomy, feedback, and task identity. In their development study, they administered the Job Characteristic Inventory (JCI) to two highly dissimiliar samples, one a group of 1,161 medical center personnel and the other a group of 192 managers and supervisors employed by a manufacturing organization. Factor analysis results confirmed the a priori dimensionality of the instrument for both samples. Support for the a priori dimensionality of the JCI also has been presented by Pierce and Dunham (1978) in a setting in which the dimensionality of the JDS broke down. The only study not confirming the dimensionality of the JCI was Brief and Aldag (1978).

Overall, then, the research evidence appears to indicate that the JDS may be sample-specific and that the dimensionality of tasks as measured by the JCI may be more consistent across samples. The purpose of the present study is to investigate the reliability and empirical dimensionality of the JCI across four diverse samples. Results should provide needed insights into the utility of the JCI, relative to existing evidence pertaining to the JDS, for the measurement of perceived task characteristics.

Method

The Instrument—Individual perceptions of task characteristics were measured with the JCI (Sims et al., 1976), which provides measures of variety, autonomy, feedback, and identity with 5, 6, 6, and 4 items, respectively. Respondents are asked to indicate how much each of the aspects of work described by the questionnaire is present in their current job. Responses are provided on 5-point Likert scales anchored by "very much" and "very little." The JCI items are reproduced in Sims et al. (1976). The item numbers used in this study refer to the original item numbers, adjusted to account for those deleted from the final version of the JCI (the original item #1 was deleted; item #2 was renumbered as #1, etc.).

Samples and Procedures—The four research sites utilized for this study were all located in a large southwestern city. Confidentiality was guaranteed for all participants. Each sample and the procedures for questionnaire administration are described individually.

The manufacturing sample consisted of 340 employees of a large, nonunionized industrial plant. Employees were given a copy of the questionnaire and a stamped envelope addressed to one of the researchers. A cover letter asked that the questionnaire be completed on the employees' own time and returned directly to the researchers. A total of 171 (50.3 percent) usable questionnaires were returned.

The retail sample was composed of sales associates employed by a branch department store of a nationwide retail chain. Associates completed the questionnaire on-site during store hours in a central meeting room. A total of 168 usable questionnaires were obtained. This figure represents 74 percent of all potential respondents. Remaining employees did not participate because of scheduling difficulties.

Professional participants in the study were resident physicians working in a large general hospital. Residents received a questionnaire and a postage-paid envelope for the return of the questionnaire directly to the researchers. Of the 144 questionnaires distributed, 87 were completed and returned (a 60.4 percent response rate). The questionnaire asked residents to describe their jobs and working conditions in the department in which they were currently working. It should be noted that, after reviewing the questionnaire with staff physicians at the hospital, the wording of some items was minimally edited to improve applicability to a medical setting (i.e., "supervisor" was changed to "attending staff physician," "perform a job" was changed to "care for a patient," etc.). In addition, one JCI item (autonomy 13) was deleted at the request of hospital administrators.

The MBA sample consisted of 450 MBA students attending night classes at a large university. The 450 students represented a random sample of approximately 1,000 part-time MBA students enrolled at the university. All participants were employed on a full-time basis in a variety of manufacturing, refining, service, and retail organizations, possessed an undergraduate degree, and were pursuing the MBA in the evening. All participants were mailed a questionnaire, a letter of explanation, and a postage-paid envelope addressed to one of the researchers. The letter indicated that the questionnaire should be completed with reference to the job the respondent currently held. A total of 163 (32.6 percent) usable questionnaires were returned.

Green and Tull (1975) have indicated that the response rates for surveys typically fall well below 50 percent. This figure also is consistent with Clover and Balsley (1979) and Stone (1978). Hence, the response rates obtained in this study, although lower than desired, are not atypical.

Analyses—The internal consistency of the JCI was assessed by calculating Cronbach's coefficient alpha for each subscale for each sample. Dimensionality of tasks as measured by the JCI was determined by subjecting the data from each sample to a principal component factor analysis with oblique rotation. An oblique rotation was utilized because the dimensions are conceptualized as being interrelated (Hackman & Oldham, 1975).

Next, the four samples were combined into one aggregate sample ($n = 589$). The data from the aggregate sample then were factor analyzed by the same procedure. The aggregate data should be representative of an extremely heterogeneous sample due to the diversity of the four smaller samples.

The extent to which the empirical dimensionality of tasks was reproduced across samples was determined through the calculation of factor congruency coefficients (Harman, 1976) for each pair of samples. Factor congruency refers to the stability of the factor structure across samples. Coefficients may range from 1.00 (perfect congruency), through 0.0 (perfect absence of congruency), to -1.00 (perfect inverse congruency). Harman (1976) indicates that no set procedure exists for interpreting scores, by way of statistical significance or general decision rules. It can be inferred from Harman's examples and discussion, however, that coefficients above .80 are entirely acceptable and coefficients below .50 are unacceptable.

Factor congruency coefficients were computed for each a priori factor for every pair of samples. Coefficients also were computed for all possible combinations of the results obtained from the four samples and the aggregate sample and other published factor analysis results obtained from the JCI. This later category included Sims et al. (1976), Pierce and Dunham (1978), and Brief and Aldag (1978).

Results

All results summarized here but not reported in Table 1 are available from the authors on request. Values for alpha were all quite high, although values are accentuated by the repetition of certain questions within the JCI. With one exception (retail sample, feedback subscale), all internal consistency estimates exceeded .80. Hence, the internal consistency of the JCI would appear to meet minimum requirements for basic research.

The factor analysis results for the four individual samples generally confirmed the a priori dimensionality of the scale. In all cases, four-factor solutions emerged naturally, were supported by the eigenvalue patterns, and were most interpretable. The manufacturing sample results indicated a clear confirmation of the a priori factor structure. Only one item (feedback 25) failed to load as expected. Autonomy 18 and 28 and variety 12 had fairly large loadings on other factors, but in each case the a priori factor loading was at least .12 larger than the stray loading. The four-factor solution explained 65 percent of the variance.

The retail sample results also confirmed the a priori solution. Identity 19 had a stray loading of .29 on the autonomy factor but also had a loading of -.48 on the identity factor; 54 percent of the variance was explained. The results obtained from the professional sample were less clear-cut, however. Feedback 30 had a relative low loading of .32 on the feedback factor. Autonomy 28 did not load on any factor. Identity 19 and 24 both loaded stronger on the autonomy factor than on the identity factor. Finally, variety 1, 17, and 22 loaded on both the variety and the autonomy factors. However, as indicated previously, the four-factor solution was the

TABLE 1
Factor Congruency Coefficients

Sample Pairs	Factors			
	Feedback	*Autonomy*	*Identity*	*Variety*
Manufacturing and retail	.95	.92	.93	.97
Manufacturing and professional	.93	.88	.92	.92
Manufacturing and MBA	.94	.92	.94	.96
Retail and professional	.97	.94	.85	.94
Retail and MBA	.98	.93	.97	.99
Professional and MBA	.96	.84	.88	.92
Manufacturing and Sims et al.	.87	.86	.92	.94
Retail and Sims et al.	.90	.92	.94	.97
Professional and Sims et al.	.92	.94	.82	.96
MBA and Sims et al.	.92	.93	.96	.97
Aggregate and Sims et al.	.92	.93	.92	.97
Manufacturing and Brief and Aldag	.96	.88	.91	.95
Retail and Brief and Aldag	.97	.92	.93	.94
Professional and Brief and Aldag	.95	.82	.87	.86
MBA and Brief and Aldag	.96	.89	.89	.95
Aggregate and Brief and Aldag	.97	.92	.92	.95
Manufacturing and Pierce and Dunham	.94	.95	.96	.95
Retail and Pierce and Dunham	.97	.96	.95	.98
Professional and Pierce and Dunham	.97	.88	.94	.97
MBA and Pierce and Dunham	.97	.98	.90	.97
Aggregate and Pierce and Dunham	.98	.95	.98	.99
Sims et al. and Brief and Aldag	.97	.91	.93	.90
Sims et al. and Pierce and Dunham	.99	.95	.95	.98
Brief and Aldag and Pierce and Dunham	.94	.94	.90	.94

most interpretable and most items (14 of 20) did load as expected; 54 percent of the variance was explained. The results obtained from the MBA sample clearly confirmed the a priori structure. Only one item (autonomy 28) failed to load properly. Otherwise, there were few stray loadings. The four-factor solution explained 57 percent of the variance. The aggregate sample results also confirmed the a priori dimensionality. All items loaded as expected and there were few stray loadings; 60 percent of the variance was explained.

The factor congruency coefficients are presented in Table 1. Of the 96 coefficients calculated, 82 exceed .90 and all others exceed .80. Hence, the four-factor solution appears to be highly congruent across diverse samples. Variety and feedback each have one coefficient below .90, and autonomy and identity have 7 and 5 coefficients, respectively, below .90. It also should be noted that 9 of the 14 coefficients below .90 are associated with the professional sample. Overall, however, the factor congruency coefficients offer support for the stability of task dimensionality as measured by the JCI, especially in light of the diverse nature of the samples used in this study.

Discussion

The purpose of this study was to assess the cross-sample stability of a measure of perceived task attributes, the JCI. Data from four samples indicated that task dimensionality as measured by the JCI is consistent and reproducible across different settings. As could be expected, stability was not perfect, and some minor variations were found. However, considering the diverse nature of the samples and the high congruency coefficients obtained, the evidence appears to indicate that the JCI may have considerable utility for future task design research.

Of course, these results alone do not justify the automatic acceptance of the JCI as the best method for measuring perceived task characteristics. The JDS has received a great deal more use in task design research, and its value has been documented (Pierce & Dunham, 1976). The existing evidence, however, seems sufficient to justify additional research aimed at a critical assessment of the psychometric properties of the JCI to determine its relative value.

Further, the need for additional research is reinforced by limitations in the present study. For example, data were collected from only 4 samples, whereas Dunham et al. (1977) present data from 20 samples with a total *n* of almost 6,000. A second limitation of the study relates to the absence of criterion measures (interview data, objective measures, etc.) against which perceived dimensionality could be assessed. However, the primary focus of the research was upon perceived task attributes, and the limitation is not felt to be serious.

In summary, the data indicate that the dimensionality of tasks as measured by the JCI may be less sample-specific than when measured by the JDS. Additional research is needed to explore the utility of the JCI for other samples and settings and to extend the findings of the present study.

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THE CONVERGENT AND DISCRIMINANT VALIDITIES BETWEEN THE IOR AND THE JDI: ENGLISH AND SPANISH FORMS[1]

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Recently, convergent and discriminant validity procedures (Campbell & Fiske, 1959; Kavanagh, MacKinney, & Wolins, 1971) have been applied to standardized job satisfaction instruments for the assessment of construct validity (Dunham, Smith, and Blackburn, 1977; Gillet & Schwab, 1975).

Most studies to date have dealt with only the English versions of job satisfaction instruments. In a unique study done by Katerberg, Smith and Hoy (1977), the response variance to the Job Descriptive Index (JDI) and the Index of Organizational Reactions (IOR) English and translated Spanish forms were studied for 128 bilingual employees of a large retail organization in the United States. Of the 128 employees studied, 57 were of Puerto Rican extraction and 71 were of Cuban extraction. The main objective of the research was to determine if the responses to the Spanish forms of the two instruments were equivalent to those of their English counterparts. No attempt was made to assess convergent and discriminant validities among the four forms.

The present study entails a reanalysis of the data reported by Katerberg et al. (1977). There are several reasons for this reanalysis: (1) to examine the convergent and discriminant validities of the four forms or *methods* (JDI-English, JDI-Spanish, IOR-English, and IOR-Spanish) over time; (2) to compare the convergent and discriminant validities of the JDI-English and Spanish forms with the convergent and discriminant validities of the IOR-English and Spanish forms over time; and (3) to assess whether convergence was greater when the instrument was held constant or when language was held constant.

Method

Instruments—The JDI developed by Smith, Kendall, and Hulin (1969) was one of the two instruments employed to measure job satisfaction. The

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JDI measures five facets of job satisfaction: work itself, supervision, promotion, pay, and co-workers, by means of adjectives or adjective phrase checklists. The respondent is asked to respond to each adjective or adjective phrase that may or may not describe his or her present job with a "yes," "?," or "no" response.

The other instrument of job satisfaction employed in this study was the IOR (Smith, 1976). The IOR consists of 42 items measuring 8 facets of job satisfaction: kind of work, supervision, career future, financial rewards, co-workers, amount of work, physical surroundings, and company identification. Each scale consists of from four to six items, and each item is either a phrase or question that has five response alternatives.

A detailed description of the translation procedures for the two instruments from English to Spanish was given by Katerberg et al. (1977). Both the English and Spanish forms of the two instruments were administered to each subject at two points in time separated by a six-week interval.

Subjects—In the initial Katerberg et al. study, 203 bilingual employees working in a large retail organization were surveyed. Katerberg et al. analyzed data collected on 128 of those 203 employees because of missing data for some. In the present study, only data collected on 82 employees were used. The difference in the size of the samples for the two studies was due to the use of different criteria in dropping cases because of missing data. The percentage of Cubans and Puerto Ricans remained essentially the same.

The sample characteristics of those 82 respondents were as follows: 46 (56 percent) were of Cuban extraction working in retail outlets of the organization in Miami and 36 (44 percent) were of Puerto Rican extraction working in retail outlets in New York City; 53 (64 percent) were under 30 years of age at the time of the survey; 45 (55 percent) were females; 45 (55 percent) had been with the organization from 1 to 5 years; 74 (90 percent) had learned to speak Spanish as their first language; 48 (58 percent) felt comfortable speaking either English or Spanish; and 8 (10 percent) voluntarily left the organization within an 8-month period of time after the second administration of the survey.

Analyses—The four methods of measuring job satisfaction and their scales were placed in a multitrait-multimethod matrix for time 1 and time 2 responses. The convergent and discriminant validities of the four methods were assessed by the guidelines proposed by Campbell and Fiske (1959) and by an analysis of variance model (Kavanagh et al., 1971). These same procedures were used to compare the convergent and discriminant validities of the JDI-English and Spanish forms with the IOR-English and Spanish forms over time. A *t*-test comparing the average correlations in the appropriate validity diagonals was done to assess whether convergence was greater across the same language or across the same instrument.

Results

The average test-retest Pearson correlation coefficients for the JDI English and Spanish forms were .71 and .66. The average test-retest correlation coefficients for the five scales of the IOR English and Spanish forms that measure the same traits as the JDI forms were .73 and .74.

Table 1 shows the multitrait-multimethod matrix for the four methods of measuring job satisfaction at time 1 and time 2. In assessing a multitrait-multimethod matrix Campbell and Fiske (1959) suggested four criteria. The criterion for convergent validity is that the correlation between similar scales or traits measured by different methods should be significantly different from zero "to encourage further examination of validity." For both time points of measurement all convergent validities (underlined diagonal coefficients, see Table 1) were significantly different from zero ($p < .001$). The average convergent validities for the four methods ranged from .69 to .73 for time 1. For time 2, all four methods had the same average convergent validities, .77.

The first criterion to be met for discriminant validity is that the convergent validity correlations exceed heterotrait-heteromethod correlations. That is, the correlations between similar traits measured by different methods should exceed correlations between different traits measured by different methods. All four methods for both time points of measurement met this criterion quite well. For time 1 and time 2 the proportion of convergent validities exceeding heterotrait-heteromethod correlations ranged from .97 to .99.

The second criterion to be met for discriminant validity is that correlations between similar traits measured by different methods exceed correlations between dissimilar traits measured by the same method. The proportion of convergent validities that exceeded heterotrait-monomethod correlations for the four methods for both time points ranged from .95 to 1.00.

The final criterion for determining discriminant validity is that a similar pattern of correlations be replicated within the heterotrait-monomethod triangle and the heterotrait-heteromethod triangles for each method. This criterion was assessed by Kendall's coefficient of concordance (Siegel, 1956). All four methods for both time points of measurement had coefficients that were significantly different from zero. However, it should be noted that time 1 concordance coefficients, ranging from .70 to .80, were somewhat larger than time 2 coefficients, ranging from .51 to .69.

The second phase of assessing convergent and discriminant validities of the four methods was done using the analysis of variance model recommended by Kavanagh et al. (1971). This model assumes individual respondents as random effects and traits and methods as fixed effects. Dunham et al. (1977, p. 427) summarized the utility of this model:

1. The individual main effect indicates the extent to which the alternative scales and methods yield similar scores among the respondents. This provides an overall estimate of convergent validity;

2. The individual by scale interaction provides a measure of discriminant validity based on the extent to which each respondent's scale patterns are similar across all methods and different from those of other individuals;
3. The individual by method interaction indicates the extent and source of bias present, since it reveals disagreement within individuals measured across methods;
4. Error variance.

The results of this procedure for the multitrait-multimethod matrix (Table 1) can be seen in the top third section of Table 2. At each time point of measurement there was significant convergent validity ($F=38.08$, $p<.01$; $F=61.85$, $p<.01$), discriminant validity ($F=6.28$, $p<.01$; $F=8.17$, $p<.01$), and I × method variance ($F=1.88$, $p<.01$; $F=2.22$, $p<.01$).

This analysis of variance model allows for the direct computation of variance components. "The variance components allow one to make inferences about meaningful effects, particularly relative to unexplained variance (error), while controlling the sample size" (Kavanagh et al., 1971, p. 38) *for within study comparisons only*. As can be seen from Table 2, the convergent and discriminant validity components for time 1 and time 2 were quite large compared to their I × method variance components. However, the error variance components of "variance of unknown sources" were quite large within each point of measurement. In fact, the error variance was larger than the I × method variance components at each time point.

Kavanagh et al. (1971) devised a variance component index for directly comparing multitrait-multimethod matrices for various situations, such as in the case of longitudinal studies. The variance component index is the observed or "true variance" component divided by the observed or "true variance" component plus error. As shown in Table 2, there was an increase for convergent and discriminant validity as well as for I × method variance from time 1 to time 2, with convergent validity variance increasing the most for the second administration of the four methods.

The analyses to this point have indicated that the four methods showed almost equal convergent and discriminant validity properties. However, this does not mean that the English and Spanish forms were completely equivalent. A linear transformation may be necessary to achieve this end (Katerberg et al., 1977).

The second purpose of the study was to compare the convergent and discriminant validities of the JDI-English and JDI-Spanish forms with the IOR-English and IOR-Spanish forms. This comparison was made first in terms of Campbell and Fiske's (1959) guidelines and then by the analysis of variance model.

The average convergent validities for the JDI-English and Spanish forms for time 1 and time 2 were .88 and .91. The average convergent validities for the two IOR forms measuring the same traits as the two

TABLE
Multitrait-Multimethod Matrix,

Traits	r_{t1t2}	Method 1 (JDI-English)								Method 2 (JDI-Spanish)							
		A_1	B_1	C_1	D_1	E_1	F_1	G_1	H_1	A_2	B_2	C_2	D_2	E_2	F_2	G_2	H_2
Method 1 (JDI-English)																	I
A_1 Work	.75		60	44	34	69	—	—	—	91	59	49	33	60	—	—	—
B_1 Supervision	.66	52		46	43	69	—	—	—	58	93	44	39	68	—	—	—
C_1 Promotion	.70	47	44		28	46	—	—	—	47	48	90	30	50	—	—	—
D_1 Pay	.76	34	27	28		50	—	—	—	38	47	38	89	49	—	—	—
E_1 Co-workers	.68	42	42	37	38		—	—	—	72	72	47	47	91	—	—	—
F_1		—	—	—	—	—		—	—	—	—	—	—	—	—	—	—
G_1		—	—	—	—	—	—		—	—	—	—	—	—	—	—	—
H_1		—	—	—	—	—	—	—		—	—	—	—	—	—	—	—
Method 2 (JDI-Spanish)																	
A_2 Work	.73	89	38	39	24	31	—	—	—		59	53	38	61	—	—	—
B_2 Supervision	.66	56	94	46	30	43	—	—	—	43		49	41	69	—	—	—
C_2 Promotion	.70	46	39	87	21	33	—	—	—	40	44		36	47	—	—	—
D_2 Pay	.56	29	29	29	82	37	—	—	—	22	33	39		50	—	—	—
E_2 Co-workers	.65	39	36	30	32	87	—	—	—	34	37	29	34		—	—	—
F_2		—	—	—	—	—	—	—	—	—	—	—	—	—		—	—
G_2		—	—	—	—	—	—	—	—	—	—	—	—	—	—		—
H_2		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Method 3 (IOR-English)																	III
A_3 Kind of work	.72	73	44	40	33	38	—	—	—	63	48	37	26	40	—	—	—
B_3 Supervision	.76	49	66	55	21	39	—	—	—	43	71	51	30	36	—	—	—
C_3 Career future	.77	62	45	62	29	46	—	—	—	51	49	50	20	43	—	—	—
D_3 Financial rewards	.70	39	27	36	78	40	—	—	—	30	30	25	64	41	—	—	—
E_3 Co-workers	.69	40	47	46	30	58	—	—	—	37	50	40	31	54	—	—	—
F_3 Amount of work	.73	54	39	41	31	40	—	—	—	52	46	39	31	42	—	—	—
G_3 Physical surrounding	.63	40	21	38	32	31	—	—	—	44	22	34	31	27	—	—	—
H_3 Company identification	.78	52	41	58	40	52	—	—	—	41	48	54	44	52	—	—	—
Method 4 (IOR-Spanish)																	
A_4 Kind of work	.77	66	29	45	32	28	—	—	—	61	33	43	26	34	—	—	—
B_4 Supervision	.76	42	66	57	26	36	—	—	—	39	73	48	28	29	—	—	—
C_4 Career future	.77	58	48	60	39	42	—	—	—	45	54	53	33	36	—	—	—
D_4 Financial rewards	.74	35	23	27	74	36	—	—	—	25	25	20	63	38	—	—	—
E_4 Co-workers	.66	37	43	48	27	54	—	—	—	33	47	38	25	50	—	—	—
F_4 Amount of work	.57	44	29	41	29	28	—	—	—	46	36	40	24	39	—	—	—
G_4 Physical surrounding	.69	44	31	40	37	32	—	—	—	45	34	34	36	30	—	—	—
H_4 Company identification	.78	56	41	59	52	55	—	—	—	48	46	53	52	52	—	—	—

[a] Validity diagonals are underlined. Heterotrait-monomethod triangles are enclosed by solid lines. Heterotrait-heteromethod triangles are enclosed by broken lines. Lower diagonal of matrix, Time 1 coefficients; upper diagonal of matrix, Time 2 coefficients.

1

Time 1 and Time 2[a]

	Method 3 (IOR-English)								Method 4 (IOR-Spanish)							
	A_3	B_3	C_3	D_3	E_3	F_3	G_3	H_3	A_4	B_4	C_4	D_4	E_4	F_4	G_4	H_4
II																
	75	43	37	40	50	—	—	—	78	42	46	33	49	—	—	—
	51	74	44	34	58	—	—	—	52	70	52	39	60	—	—	—
	57	64	64	47	58	—	—	—	60	57	72	53	55	—	—	—
	38	42	28	77	38	—	—	—	38	38	28	78	42	—	—	—
	37	50	33	34	58	—	—	—	38	48	38	41	56	—	—	—
	46	52	40	44	47	—	—	—	51	41	40	50	55	—	—	—
	43	49	41	29	43	—	—	—	51	48	45	34	44	—	—	—
	59	56	55	55	66	—	—	—	57	51	54	56	69	—	—	—
	70	39	49	39	48	—	—	—	72	40	48	34	49	—	—	—
	54	71	52	31	60	—	—	—	57	68	57	39	59	—	—	—
	57	62	60	48	55	—	—	—	62	56	68	53	53	—	—	—
	42	43	35	81	43	—	—	—	46	43	40	81	46	—	—	—
	44	54	45	41	66	—	—	—	42	52	46	46	64	—	—	—
	49	57	51	38	57	—	—	—	47	54	51	43	57	—	—	—
	41	44	38	32	45	—	—	—	48	42	44	32	42	—	—	—
	54	53	51	55	60	—	—	—	51	50	54	55	66	—	—	—
IV																
		52	59	45	35	50	40	57	89	51	59	40	35	53	36	63
	44		68	42	66	62	56	70	49	92	71	38	67	59	56	71
	62	64		54	52	60	59	69	60	68	94	56	52	62	60	70
	35	41	48		36	53	40	50	50	42	57	92	33	50	41	52
	44	60	54	39		54	46	61	39	61	59	41	89	51	51	71
	59	62	56	43	57		60	63	47	67	65	42	63	72	48	74
	37	39	40	41	49	50		56	39	49	54	42	38	53	84	53
	62	61	66	54	55	58	48		55	67	68	54	61	60	53	92
	84	42	66	42	38	54	41	60		51	60	45	42	52	37	57
	45	85	59	40	56	58	39	60	42		70	39	67	72	48	67
	58	69	88	50	56	51	35	62	64	58		57	59	64	55	69
	30	34	40	88	33	38	39	44	34	35	40		41	40	43	57
	44	55	55	38	87	50	47	57	40	58	56	32		66	48	68
	55	54	54	41	45	78	51	55	62	59	49	42	42		48	72
	41	45	46	44	60	54	87	50	40	49	40	46	62	54		52
	61	60	67	58	52	58	50	89	59	61	62	53	56	50	54	

TABLE 2
Analysis of Variance, Variance Components, and Indexes of the JDI and IOR for Time 1 and Time 2
($N=82$)

	Time 1					*Time 2*				
Source	*df*	*MS*	*F*	*Variance Component*	*Indexes*	*df*	*MS*	*F*	*Variance Component*	*Indexes*
	JDI/IOR—English and Spanish Forms[a]					*JDI/IOR—English and Spanish Forms*[b]				
Individual (I)	81	9.52	38.08*	.46	.64	81	11.13	61.86*	.55	.73
I × scale	324	1.57	6.28*	.32	.55	324	1.47	8.17*	.29	.59
I × method	243	.47	1.88*	.03	.10	243	.40	2.22*	.03	.13
Error	972	.25		.26		972	.18		.20	
	JDI—English and Spanish Forms[c]					*JDI—English and Spanish Forms*[d]				
Individual (I)	81	4.86	37.38*	.47	.82	81	5.97	59.70*	.56	.88
I × scale	324	1.16	8.92*	.53	.84	324	.97	9.10*	.41	.84
I × method	81	.10	.77	.02	.17	81	.10	1.00	.00	.00
Error	324	.13		.10		324	.10		.08	
	IOR—English and Spanish Forms[e]					IOR—English and Spanish Forms[f]				
Individual (I)	81	5.67	43.61*	.55	.81	81	6.07	121.40*	.60	.88
I × scale	324	.94	7.23*	.39	.75	324	.91	18.20*	.40	.83
I × method	81	.20	1.54*	.01	.07	81	.20	4.00*	.01	.11
Error	324	.13		.13		324	.05		.08	

[a] Derived from the *Time 1* multitrait-multimethod matrix.
[b] Derived from the *Time 2* multitrait-multimethod matrix.
[c] Derived from the lower diagonal of quadrant I of Table 1.
[d] Derived from the upper diagonal of quadrant I of Table 1.
[e] Derived from the lower diagonal of quadrant IV of Table 1.
[f] Derived from the upper diagonal of quadrant IV of Table 1.
*$p<.01$

forms of the JDI were .88 and .91. Both forms of the two instruments for both time points met the first two Campbell and Fiske criteria for discriminant validity.

The third criterion for discriminant validity of correlations having similar patterns within the heterotrait-heteromethod triangles and heterotrait-monomethod triangles was not met equally well for the two forms of each instruments. Using Kendall's coefficient of concordance, the JDI-English and JDI-Spanish forms for times 1 and 2 ($W=.81$, $p<.01$; $W=.93$, $p<.01$) did not meet this criterion for discriminant validity as well as did the IOR-English and IOR-Spanish forms ($W=.91$, $p<.01$; $W=.91$, $p<.01$).

A summary of the analyses of variance for assessing convergent and discriminant validity of the JDI and IOR English and Spanish forms for the two time points of measurement is shown in the bottom two-thirds of Table 2. All four analyses of variance showed convergent and discriminant validity for the two forms of the JDI and IOR. Of interest is the nonsignificant I × method variance effect for the JDI English and Spanish forms for times 1 and 2 ($F=.77$, n.s.; $F=1.00$, n.s.) and the significant effect of I × method variance for the IOR English and Spanish forms for both time points of measurement ($F=1.54$, $p<.01$; $F=4.00$; $p<.01$).

The final purpose of the study was to assess whether convergence was greater for the same instrument (with different languages), or for the same language (with different instruments). For time 1 and time 2, the five coefficients on the validity diagonal JDI-English/JDI-Spanish and the five coefficients on the validity diagonal IOR-English/IOR-Spanish were compared with an independent groups *t*-test to the five coefficients on the validity diagonal JDI-English/IOR-English and the five coefficients on the validity diagonal JDI-Spanish/IOR-Spanish (Table 1). For both time periods the *t*-values were significant (time 1: $t=7.31$, $p<.01$; time 2: $t=2.90$, $p<.01$) indicating higher convergence for the same instrument than for the same language.

Discussion

The results of the present investigation demonstrated that the JDI and IOR English forms were successfully translated to Spanish. The high convergent and discriminant validities, along with the greater convergence across the same instrument than across the same language, support this conclusion. However, there was some evidence to suggest that the adequacy of the translation was not equal for the two instruments. This inference is made from the significant I × method variance effect for the IOR English and Spanish forms for the two time points of measurement and not for the JDI English and Spanish forms. It is possible that this finding resulted because of the different translation requirements for the JDI and IOR. The JDI uses only adjectives and adjective phrases, whereas the IOR employs sentences and phrases. It may be an easier task to translate adjective or adjective phrases from one language to another while still maintaining the measurement of the job satisfaction facets of interest as compared to translating complete sentences.

The results of this study also indicated that the convergent validity increased over time *for the four methods* while the discriminant validity decreased. This possibly could be attributed to subjects being very diligent in responding to the survey for the first administration but not being as careful in responding to the survey during the second administration.

Future research should investigate whether the English and Spanish forms of the scales within the two instruments have similar relationships with criterion variables, such as turnover. Correlations between turnover and the two forms of the JDI and IOR scales at the two time points were calculated. Although these correlations did not reveal differences across satisfaction and turnover, these results must be tempered by the fact that only eight employees voluntarily left the organization within an eight month period after the second administration of the questionnaire. Obviously, further investigation of these variables is needed.

The sample on which this study was performed was unique in terms of its composition, and thus the results have limited external validity. Future research should be directed toward validating the IOR and JDI Spanish forms on Spanish speaking monolinguals in order to test further the validity of the present translated forms of the IOR and JDI.

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Edwin L. Cox School of Business
Southern Methodist University
Dallas, Texas 75275

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The deadline for *receipt* of all submissions is January 9, 1981. *No papers can be accepted after this date.* The following material includes a list of specific instructions provided by individual Divisions and Interest Groups. Names, addresses, and phone numbers for the Program Chairpersons of each Division or Interest Group also are listed.

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Vice-President and Program Chair
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Kellogg Graduate School of Management
Northwestern University
Evanston, Illinois 60201
(312)492-3300

SPECIAL INSTRUCTIONS FOR PROFESSIONAL DIVISIONS AND INTEREST GROUPS

BUSINESS AND POLICY PLANNING

The Division invites submission of papers and symposia covering empirical research, theory development, and teaching concerns on all aspects of business policy and planning. The submission of doctoral dissertations to be considered for two cash awards is also encouraged. All submissions will be blind reviewed.

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The 1981 theme is "Health Care Perspectives for the 1980's." Papers are invited relative to themes such as innovation and change, health care marketing, planning and policy problems, international aspects, research methods, labor relations, multiunit systems, professionalism, health in the workplace, and other relevant topics.

INTERNATIONAL MANAGEMENT

Submissions are encouraged that 1) deal with international *management* in industralized countries, 2) advance theory, 3) apply research methodology in new areas, and 4) contain research or conceptual work on "ignored" topics. The above notwithstanding, all papers are welcome with open arms and will be objectively blind reviewed. Don't forget to submit panel and workshop proposals!

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Papers and symposium, panel, and workshop proposals are invited for blind review. All submissions must relate to process or content in management education or development. Data-based, futuristic, and career-oriented submissions are encouraged. Awards of $100 will be given for: 1) the best data-based papers, and 2) the best MED research proposal.

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The Division invites papers related to relevant topics of historical interest. Some areas for consideration are: a) contributions and/or biographics of important management personalities; b) the development and/or comparisons of various management philosophies; and c) the future of management though. Proposals for symposia and panels are also welcomed.

MANAGERIAL CONSULTATION

The Division invites papers and proposals for discussion panels and symposia on all aspects of consultation. Examples of areas for submission include process conceptualizations, methodologies and assessments, interchanges with professional consulting firms, and case studies. Submissions for panels and symposia must be received by December 12, 1980, and papers by January 9, 1981.

ORGANIZATION BEHAVIOR

The Division will give two recognition awards: one for the best competitive paper (may be coauthored) and the one for the best competitive paper based on a dissertation (dissertation papers must not be coauthored and must be clearly identified as a dissertation paper). Reviewers of *all* papers and symposium proposals will use, as one of their evaluation criteria, the degree to which the submission addresses critical real-world organizational problems.

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Papers are invited on all topics related to organizational communication. Topics might include theoretical and empirical work on interorganizational communication, cross-cultural organizational communication, research methodology, and pragmatic organizational communication issues of relevance to practitioners. The author(s) of the best paper will receive an award in recognition of superior scholarship.

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Research, theory and position papers and symposia panel and workshop proposals are invited. Papers and proposals involving state-of-the-practice are especially encouraged. Topics of speical concern include the production policies and methods of foreign manufacturers and P/OM in the entertainment industry.

PUBLIC SECTOR DIVISION

Papers on management or policy analysis issues in public, quasipublic and not-for-profit sectors are welcome. In addition, studies comparing structural, environmental, and technological variables for organizations in these sectors versus the private sector are welcome. A $100 prize will be awarded for the best competitive paper.

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The Division invites papers and symposia on all aspects of the corporation-society relationship and encourages empirical or theoretical contributions in the following areas: corporate political action, environmental analysis and planning, business ethics, social issues in crosscultural settings, and future business-society relations. Doctoral papers are encouraged.

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The interest group invites submission of papers and symposia dealing with entrepreneurship, small business, small business teaching methods, and conceptual issues in entrepreneurship. Papers describing empirical research are especially encouraged. Submission of doctoral dissertations for a cash award is also invited.

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This interest group solicits papers and symposia on all micro and macro aspects of R&D/Technology/Innovation Management. Submissions covering innovation, technology transfer, technology strategy, technical communications, technical supervision, technical careers are of particular interest. Special consideration will be given to papers with both an empirical base and practical management applications.

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The Status of Women Interest Group solicits high quality papers that examine significant issues facing women within organizations and/or papers exploring sex differences. Especially encouraged are papers dealing with job disillusionment, power and success, the reentering woman, underutilization of talent, minority women, women supervising women, and women's classroom skills. Deadline for panels, workshops, symposia: December 15, 1980; Papers: January 2, 1981.

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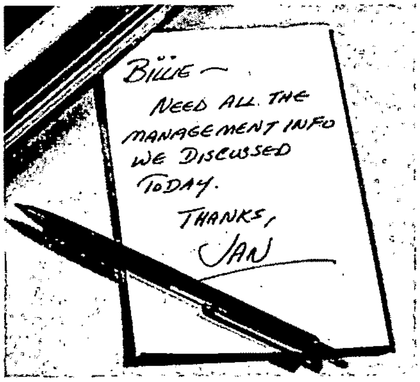

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